



# WGSBN Bulletin



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Cover image: “Moonrise over Dinkinesh”: (152830) Dinkinesh and its satellite (152830) Dinkinesh I (Selam) imaged by the Lucy spacecraft's L'LORRI camera on November 1, 2023, at a range of ~430 km. (NASA/Goddard/SwRI/Johns Hopkins APL/NOIRLab)

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## Errata

The following section corrects errors that have appeared in this publication (indicated as *Bull.*, with volume, issue and page number) or in names or citations published in the *Minor Planet Circulars*. Negative line numbers count from the bottom of the page (in the *Bulletin*) or from the bottom of the page or the bottom of the (second) column (in the *MPCs*).

| Reference        | Line(s) |  |
|------------------|---------|--|
| <i>MPC</i> 7949  | –17     | <i>For</i> of ‘Finnish Folk-Tales’ <i>read Suomen kansa satuja i tarinita (Finnish Folk Tales and Stories)</i> [(2820) citation] |
| <i>MPC</i> 25445 | 14      | <i>For</i> b. 1945 <i>read</i> b. 1945 [(6075) citation]   |
| <i>MPC</i> 26764 | – 5     | <i>For</i> late-gothic/baroque <i>read</i> late-Gothic/Baroque [(6106) citation]   |
| <i>MPC</i> 29147 | 24      | <i>For</i> (Stargazer) <i>read</i> (Stargazer) [(6465) citation]   |
| <i>MPC</i> 35492 | 35      | <i>For</i> (b. 1908) <i>read</i> (1908–1978) [(9427) citation]   |
| <i>MPC</i> 35492 | 38      | <i>For</i> in 1980 <i>read</i> in 1978 [(9427) citation]   |
| <i>MPC</i> 41029 | –19     | <i>For</i> (1955) <i>read</i> (b. 1955) [(9425) citation]  |
| <i>MPC</i> 42366 | –44     | <i>For</i> Drymas <i>read</i> Dymas [(18278) name]   |
| <i>MPC</i> 42366 | –41     | <i>For</i> Drymas <i>read</i> Dymas [(18278) citation]   |
| <i>MPC</i> 42673 | –21     | <i>For</i> gynaecologist <i>read</i> gynecologist [(12674) citation]   |
| <i>MPC</i> 44593 | – 7     | <i>For</i> Sannai <i>read</i> “Sannai” [(6667) citation]   |
| <i>MPC</i> 44593 | – 6     | <i>For</i> mura <i>read</i> “mura” [(6667) citation]   |
| <i>MPC</i> 48394 | 5       | <i>For</i> (b. 1922) <i>read</i> (b. 1921) [(12811) citation]  |
| <i>MPC</i> 49675 | –17     | <i>For</i> aereonautical <i>read</i> aeronautical [(18542) citation]   |
| <i>MPC</i> 58595 | – 4     | <i>For</i> Cerreto D’Asti <i>read</i> Cerreto d’Asti [(43881) citation]  |
| <i>MPC</i> 63640 | –23     | <i>For</i> een kiekje maken <i>read</i> “een kiekje maken” [(17521) citation]  |
| <i>MPC</i> 67760 | –10     | <i>For</i> “Little blond death” <i>read</i> Little Blond Death [(23403) citation]  |
| <i>MPC</i> 70410 | 12      | <i>For</i> bowenyueli <i>read</i> “bowenyueli” [(88878) citation]  |
| <i>MPC</i> 78271 | –23     | <i>For</i> Frederic <i>read</i> Frédéric [(230151) citation]   |

|                  |            |  |
|------------------|------------|--|
| MPC 79103        | 47         | For “Norma” and “I puritani” read <i>Norma</i> and <i>Ipuritani</i> [(18509) citation] |
| MPC 79104        | –47        | For <i>silent</i> read “silent” [(40092) citation]                                     |
| MPC 84379        | – 3        | For Eluard read Éluard [(22341) citation]  |
| MPC 89086        | 30         | For (b. 1946) read (b. 1945) [(249540) citation]                                       |
| MPC 106500       | 17         | For Cittadivinci read Cittàdivinci [(18441) name]                                      |
| MPC 106503       | 41         | For Vansevicius read Vansevicius [(157396) name]                                       |
| MPC 106503       | 43         | For Vansevicius read Vansevicius [(157396) citation]                                   |
| MPC 110623       | –19        | For Serego Aligieri read Serego Alighieri [(24857) citation]                           |
| MPC 110639       | 5          | For become read became [(230631) citation]   |
| Bull. 3, #9, 17  | 17         | For Carrillosanchez read Carrillosánchez [(30454) name]                                |
| Bull. 3, #9, 17  | 19         | For Sanchez read Sánchez [(30454) citation]  |
| Bull. 3, #9, 17  | –13        | For Castro Chacon read Castro-Chacón [(30455) citation]                                |
| Bull. 3, #9, 36  | 13         | For Yesiltas read Yeşiltaş [(34713) name]  |
| Bull. 3, #9, 36  | 15         | For Yesiltas read Yeşiltaş [(34713) citation]  |
| Bull. 4, #5, 5   | – 6 to – 1 | Delete the name and citation for (28795).  |
| Bull. 4, #12, 17 | 11         | For Kosakissattila read Kósakissattila [(673014) name]                                 |

## Corrected Discovery Information

The following section lists corrected discovery information for numbered minor planets. The NS column contains an asterisk if the numbering was subject to the current numbering rules, the POC column contains the observatory code of the assignment (asterisked) observation of the principal provisional designation and the DOC column contains the observatory code of the discovery observation.

| Number   | NS | POC | Disc. Date | DOC | Discovery Site | Discoverer(s)       |
|----------|----|-----|------------|-----|----------------|---------------------|
| (470280) | *  | 691 | 2007-02-08 | G96 | Mount Lemmon   | Mount Lemmon Survey |
| (470317) | *  | 704 | 2007-08-09 | 704 | Socorro        | LINEAR              |
| (470360) | *  | 106 | 2007-09-08 | 703 | Catalina       | CSS                 |
| (470410) | *  | 699 | 2007-10-19 | 703 | Catalina       | CSS                 |
| (470434) | *  | 704 | 2007-12-04 | 703 | Catalina       | CSS                 |
| (470476) | *  | 691 | 2007-12-30 | 691 | Kitt Peak      | Spacewatch          |

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|          |   |     |            |     |               |                                   |
|----------|---|-----|------------|-----|---------------|-----------------------------------|
| (470480) | * | 703 | 2008-01-11 | 703 | Catalina      | CSS                               |
| (470515) | * | G96 | 2008-02-08 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (470606) | * | J75 | 2003-04-11 | 691 | Kitt Peak     | Spacewatch                        |
| (470745) | * | G96 | 2006-05-28 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (470770) | * | 703 | 2008-10-26 | 703 | Catalina      | CSS                               |
| (470932) | * | 691 | 2004-03-21 | 691 | Kitt Peak     | Spacewatch                        |
| (470946) | * | 704 | 2009-04-21 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (470954) | * | J75 | 2009-07-27 | 703 | Catalina      | CSS                               |
| (470999) | * | G96 | 2004-03-20 | 699 | Anderson Mesa | LONEOS                            |
| (471006) | * | G96 | 2009-09-21 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471035) | * | A77 | 2009-09-16 | 691 | Kitt Peak     | Spacewatch                        |
| (471036) | * | J75 | 2009-10-12 | J75 | La Sagra      | OAM                               |
| (471064) | * | 704 | 2009-11-17 | 691 | Kitt Peak     | Spacewatch                        |
| (471069) | * | 703 | 2009-10-29 | 703 | Catalina      | CSS                               |
| (471099) | * | C51 | 2010-03-17 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471103) | * | C51 | 2010-05-13 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471130) | * | 291 | 2010-02-17 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471135) | * | C51 | 2006-10-23 | 691 | Kitt Peak     | Spacewatch                        |
| (471155) | * | 809 | 2010-04-13 | 809 | La Silla      | D. L. Rabinowitz, S. Tourtellotte |
| (471173) | * | 703 | 2010-05-05 | 703 | Catalina      | CSS                               |
| (471182) | * | C51 | 2004-09-23 | 704 | Socorro       | LINEAR                            |
| (471186) | * | C51 | 2009-01-01 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471188) | * | C51 | 2010-07-05 | C51 | WISE          | WISE                              |
| (471189) | * | C51 | 2010-07-05 | C51 | WISE          | WISE                              |
| (471193) | * | C51 | 2010-07-25 | C51 | WISE          | WISE                              |
| (471194) | * | C51 | 2010-04-05 | 703 | Catalina      | CSS                               |
| (471207) | * | G96 | 2008-01-15 | 291 | Kitt Peak     | Spacewatch                        |
| (471217) | * | G96 | 2006-05-20 | 691 | Kitt Peak     | Spacewatch                        |
| (471233) | * | H36 | 2011-01-14 | H36 | Sandlot       | G. Hug                            |
| (471255) | * | G96 | 2005-08-06 | 644 | Palomar       | NEAT                              |
| (471270) | * | 703 | 2011-03-24 | 703 | Catalina      | CSS                               |
| (471275) | * | G96 | 2011-03-27 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471288) | * | 809 | 2011-04-03 | 809 | La Silla      | La Silla                          |
| (471295) | * | 691 | 2008-10-06 | 691 | Kitt Peak     | Spacewatch                        |
| (471303) | * | 691 | 2011-04-27 | 691 | Kitt Peak     | Spacewatch                        |
| (471310) | * | 703 | 2011-03-27 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471321) | * | G96 | 2010-04-02 | C51 | WISE          | WISE                              |
| (471330) | * | G96 | 2004-09-14 | 644 | Palomar       | NEAT                              |
| (471378) | * | F51 | 1995-10-24 | 691 | Kitt Peak     | Spacewatch                        |
| (471425) | * | 691 | 2010-04-12 | C51 | WISE          | WISE                              |
| (471447) | * | 691 | 2005-09-29 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471452) | * | F51 | 2010-05-12 | C51 | WISE          | WISE                              |
| (471482) | * | F51 | 2000-11-21 | 704 | Socorro       | LINEAR                            |
| (471507) | * | 703 | 2012-01-19 | 703 | Catalina      | CSS                               |
| (471592) | * | G98 | 1995-10-22 | 691 | Kitt Peak     | Spacewatch                        |
| (471619) | * | 926 | 1999-09-07 | 691 | Kitt Peak     | Spacewatch                        |
| (471629) | * | 703 | 2012-09-25 | 703 | Catalina      | CSS                               |
| (471644) | * | F51 | 2005-01-17 | 691 | Kitt Peak     | Spacewatch                        |
| (471650) | * | G96 | 2008-10-29 | 691 | Kitt Peak     | Spacewatch                        |
| (471672) | * | 691 | 2012-10-09 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471693) | * | F51 | 2008-12-01 | 691 | Kitt Peak     | Spacewatch                        |
| (471780) | * | G53 | 2008-11-20 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471892) | * | W84 | 2013-01-20 | G96 | Mount Lemmon  | Mount Lemmon Survey               |
| (471954) | * | W84 | 2013-09-08 | W84 | Cerro Tololo  | DECam                             |
| (472029) | * | F51 | 2010-01-13 | C51 | WISE          | WISE                              |

|          |   |     |            |     |                  |                      |
|----------|---|-----|------------|-----|------------------|----------------------|
| (472044) | * | G96 | 2009-02-17 | A77 | Dauban           | C. Rinner, F. Kugel  |
| (472070) | * | 691 | 2006-01-26 | 703 | Catalina         | CSS                  |
| (472075) | * | 691 | 2013-12-30 | 691 | Kitt Peak        | Spacewatch           |
| (472086) | * | F51 | 2006-12-27 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472131) | * | F51 | 2007-11-03 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472149) | * | 703 | 1997-03-02 | 691 | Kitt Peak        | Spacewatch           |
| (472153) | * | F51 | 2001-03-15 | 691 | Kitt Peak        | Spacewatch           |
| (472165) | * | G96 | 2005-07-29 | 644 | Palomar          | NEAT                 |
| (472171) | * | 691 | 2006-09-18 | 691 | Kitt Peak        | Spacewatch           |
| (472174) | * | F51 | 2003-01-01 | 704 | Socorro          | LINEAR               |
| (472184) | * | G96 | 1995-10-26 | 691 | Kitt Peak        | Spacewatch           |
| (472208) | * | 926 | 2010-05-15 | C51 | WISE             | WISE                 |
| (472228) | * | G45 | 2010-06-17 | C51 | WISE             | WISE                 |
| (472250) | * | G96 | 2008-02-13 | 703 | Catalina         | CSS                  |
| (472262) | * | W84 | 2014-08-18 | W84 | Cerro Tololo     | DECam                |
| (472271) | * | G96 | 2010-10-07 | F51 | Haleakala        | Pan-STARRS 1         |
| (472292) | * | 691 | 2010-04-29 | C51 | WISE             | WISE                 |
| (472313) | * | J04 | 2010-01-08 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472323) | * | G45 | 2008-02-13 | 703 | Catalina         | CSS                  |
| (472325) | * | F51 | 2007-10-15 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472328) | * | F51 | 2005-10-05 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472348) | * | 691 | 2009-03-31 | 691 | Kitt Peak        | Spacewatch           |
| (472352) | * | G96 | 2009-11-19 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472362) | * | F51 | 2004-04-23 | 599 | Campo Imperatore | CINEOS               |
| (472368) | * | F51 | 2005-06-27 | 691 | Kitt Peak        | Spacewatch           |
| (472373) | * | F51 | 2003-07-08 | 644 | Palomar          | NEAT                 |
| (472384) | * | 691 | 2006-01-28 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472390) | * | F51 | 2006-01-23 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472422) | * | 691 | 2005-12-02 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472436) | * | F51 | 2003-07-25 | 644 | Palomar          | NEAT                 |
| (472454) | * | 691 | 2005-02-01 | 691 | Kitt Peak        | Spacewatch           |
| (472488) | * | 703 | 1999-12-09 | 691 | Kitt Peak        | Spacewatch           |
| (472499) | * | G96 | 2009-04-22 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472508) | * | F51 | 1995-10-25 | 691 | Kitt Peak        | Spacewatch           |
| (472529) | * | F51 | 2007-10-10 | 703 | Catalina         | CSS                  |
| (472540) | * | F51 | 2008-02-08 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472570) | * | F51 | 2015-01-21 | F51 | Haleakala        | Pan-STARRS 1         |
| (472589) | * | F51 | 2008-05-07 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472596) | * | F51 | 2005-05-04 | 691 | Kitt Peak        | Spacewatch           |
| (472611) | * | G96 | 2009-12-20 | 691 | Kitt Peak        | Spacewatch           |
| (472621) | * | F51 | 2010-04-09 | 691 | Kitt Peak        | Spacewatch           |
| (472625) | * | F51 | 2006-09-25 | 703 | Catalina         | CSS                  |
| (472657) | * | F51 | 2009-02-26 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472665) | * | 691 | 2004-02-29 | 291 | Kitt Peak        | Spacewatch           |
| (472667) | * | J43 | 2003-12-19 | 704 | Socorro          | LINEAR               |
| (472668) | * | 691 | 2010-06-21 | C51 | WISE             | WISE                 |
| (472672) | * | F51 | 2010-10-10 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472687) | * | G45 | 2004-03-28 | 704 | Socorro          | LINEAR               |
| (472824) | * | F51 | 2006-01-31 | 691 | Kitt Peak        | Spacewatch           |
| (472825) | * | F51 | 2009-01-20 | 691 | Kitt Peak        | Spacewatch           |
| (472827) | * | F51 | 2006-04-08 | E12 | Siding Spring    | Siding Spring Survey |
| (472888) | * | F51 | 2004-12-19 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472895) | * | F51 | 2007-10-10 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (472920) | * | F51 | 2010-03-08 | C51 | WISE             | WISE                 |
| (472955) | * | F51 | 2007-08-13 | E12 | Siding Spring    | Siding Spring Survey |

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|          |   |     |            |     |                  |                     |
|----------|---|-----|------------|-----|------------------|---------------------|
| (472961) | * | F51 | 2004-12-19 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (472985) | * | G96 | 2010-04-10 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473031) | * | F51 | 2004-03-16 | 691 | Kitt Peak        | Spacewatch          |
| (473049) | * | F51 | 2006-10-16 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473078) | * | F51 | 2003-09-28 | 699 | Anderson Mesa    | LONEOS              |
| (473080) | * | F51 | 2008-09-05 | 691 | Kitt Peak        | Spacewatch          |
| (473090) | * | F51 | 2007-10-09 | 691 | Kitt Peak        | Spacewatch          |
| (473104) | * | G45 | 2003-08-04 | 691 | Kitt Peak        | Spacewatch          |
| (473112) | * | G45 | 2003-03-03 | 644 | Palomar          | NEAT                |
| (473115) | * | G45 | 2009-02-05 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473147) | * | F51 | 2005-06-16 | 691 | Kitt Peak        | Spacewatch          |
| (473199) | * | F51 | 2014-01-24 | F51 | Haleakala        | Pan-STARRS 1        |
| (473215) | * | F51 | 2009-01-01 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473252) | * | F51 | 2007-01-28 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473301) | * | D29 | 2000-10-06 | 691 | Kitt Peak        | Spacewatch          |
| (473322) | * | F51 | 2004-12-16 | 699 | Anderson Mesa    | LONEOS              |
| (473349) | * | F51 | 2004-02-29 | 691 | Kitt Peak        | Spacewatch          |
| (473357) | * | G45 | 2005-09-12 | 691 | Kitt Peak        | Spacewatch          |
| (473412) | * | G45 | 2000-11-29 | 691 | Kitt Peak        | Spacewatch          |
| (473438) | * | G45 | 2012-02-03 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473447) | * | F51 | 2007-04-25 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473450) | * | F51 | 2011-01-10 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473471) | * | I41 | 2006-10-19 | 691 | Kitt Peak        | Spacewatch          |
| (473503) | * | G96 | 2008-10-26 | 691 | Kitt Peak        | Spacewatch          |
| (473526) | * | F51 | 2006-09-19 | 699 | Anderson Mesa    | LONEOS              |
| (473528) | * | F51 | 2007-02-17 | 703 | Catalina         | CSS                 |
| (473539) | * | I41 | 2006-10-22 | 703 | Catalina         | CSS                 |
| (473559) | * | F51 | 2005-11-03 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473582) | * | F51 | 2008-02-13 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473601) | * | G96 | 2008-02-03 | 691 | Kitt Peak        | Spacewatch          |
| (473605) | * | F51 | 2004-11-04 | 691 | Kitt Peak        | Spacewatch          |
| (473626) | * | F51 | 2006-09-27 | 691 | Kitt Peak        | Spacewatch          |
| (473648) | * | F51 | 2007-01-28 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473659) | * | F51 | 2004-11-17 | 599 | Campo Imperatore | CINEOS              |
| (473665) | * | F51 | 2005-11-04 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473676) | * | F51 | 2003-02-21 | 644 | Palomar          | NEAT                |
| (473688) | * | J43 | 2003-10-16 | 644 | Palomar          | NEAT                |
| (473726) | * | F51 | 1997-11-30 | 691 | Kitt Peak        | Spacewatch          |
| (473771) | * | F51 | 2008-11-19 | 703 | Catalina         | CSS                 |
| (473791) | * | F51 | 1998-02-24 | 691 | Kitt Peak        | Spacewatch          |
| (473797) | * | F51 | 2005-03-12 | 691 | Kitt Peak        | Spacewatch          |
| (473814) | * | J04 | 2007-03-14 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (473826) | * | G96 | 2010-03-25 | C51 | WISE             | WISE                |
| (473838) | * | F51 | 2010-04-16 | C51 | WISE             | WISE                |
| (473891) | * | F51 | 2010-03-03 | C51 | WISE             | WISE                |
| (473966) | * | F51 | 2004-12-19 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (474005) | * | G45 | 2007-04-11 | 703 | Catalina         | CSS                 |
| (474030) | * | F51 | 2000-07-25 | 691 | Kitt Peak        | Spacewatch          |
| (474062) | * | F51 | 2010-03-18 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (474081) | * | G45 | 2006-09-29 | 699 | Anderson Mesa    | LONEOS              |
| (474092) | * | G45 | 2007-08-08 | 704 | Socorro          | LINEAR              |
| (474109) | * | F51 | 2009-03-31 | G96 | Mount Lemmon     | Mount Lemmon Survey |
| (474115) | * | F51 | 2010-01-15 | C51 | WISE             | WISE                |
| (474117) | * | F51 | 2006-08-29 | D35 | Lulin            | LUSS                |
| (474124) | * | 691 | 1995-06-29 | 691 | Kitt Peak        | Spacewatch          |

|          |   |     |            |     |               |                     |
|----------|---|-----|------------|-----|---------------|---------------------|
| (474130) | * | 691 | 1995-09-25 | 691 | Kitt Peak     | Spacewatch          |
| (474131) | * | 691 | 1995-09-25 | 691 | Kitt Peak     | Spacewatch          |
| (474132) | * | 691 | 1995-09-25 | 691 | Kitt Peak     | Spacewatch          |
| (474134) | * | 691 | 1995-09-26 | 691 | Kitt Peak     | Spacewatch          |
| (474140) | * | 691 | 1995-10-22 | 691 | Kitt Peak     | Spacewatch          |
| (474162) | * | 704 | 1999-09-07 | 704 | Socorro       | LINEAR              |
| (474235) | * | 699 | 2001-08-23 | 691 | Kitt Peak     | Spacewatch          |
| (474435) | * | 704 | 2003-04-03 | 699 | Anderson Mesa | LONEOS              |
| (474469) | * | 699 | 2003-09-22 | 699 | Anderson Mesa | LONEOS              |
| (474534) | * | 703 | 2003-10-22 | 691 | Kitt Peak     | Spacewatch          |
| (474579) | * | 704 | 2004-03-23 | 704 | Socorro       | LINEAR              |
| (474584) | * | 699 | 2004-04-16 | 691 | Kitt Peak     | Spacewatch          |
| (474608) | * | 691 | 2004-09-13 | 691 | Kitt Peak     | Spacewatch          |
| (474657) | * | G96 | 2004-12-19 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (474912) | * | 691 | 2005-09-30 | 691 | Kitt Peak     | Spacewatch          |
| (474929) | * | 691 | 2005-09-30 | 691 | Kitt Peak     | Spacewatch          |
| (474953) | * | G96 | 2005-10-01 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (475006) | * | 691 | 2005-10-09 | 691 | Kitt Peak     | Spacewatch          |
| (475102) | * | G96 | 2005-10-25 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (475131) | * | G96 | 2005-10-07 | 691 | Kitt Peak     | Spacewatch          |
| (475186) | * | 691 | 2005-10-25 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (475218) | * | G96 | 2005-11-02 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (475820) | * | G96 | 2006-11-25 | 691 | Kitt Peak     | Spacewatch          |
| (475932) | * | 703 | 2007-03-13 | 703 | Catalina      | CSS                 |
| (475940) | * | G96 | 2007-03-12 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (475992) | * | 699 | 2007-08-23 | 691 | Kitt Peak     | Spacewatch          |
| (476056) | * | 691 | 2007-09-11 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (476057) | * | 683 | 2007-09-13 | 703 | Catalina      | CSS                 |
| (476069) | * | 704 | 2007-10-12 | 704 | Socorro       | LINEAR              |
| (476104) | * | 704 | 2007-10-06 | 691 | Kitt Peak     | Spacewatch          |
| (476108) | * | 704 | 2007-10-12 | 691 | Kitt Peak     | Spacewatch          |
| (476116) | * | 704 | 2007-10-16 | 703 | Catalina      | CSS                 |
| (476137) | * | G96 | 2007-10-11 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (476147) | * | 691 | 2007-09-12 | 691 | Kitt Peak     | Spacewatch          |
| (476181) | * | 704 | 2007-11-12 | 704 | Socorro       | LINEAR              |
| (476298) | * | 704 | 2007-11-08 | 704 | Socorro       | LINEAR              |
| (476300) | * | 704 | 2007-11-19 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (476410) | * | 691 | 2005-09-13 | 691 | Kitt Peak     | Spacewatch          |
| (476415) | * | 691 | 2008-02-28 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (476430) | * | G96 | 2008-02-29 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (476435) | * | 691 | 2008-02-28 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (476467) | * | G96 | 2008-03-12 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (476523) | * | G96 | 2008-04-06 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (476558) | * | G96 | 2008-05-28 | 691 | Kitt Peak     | Spacewatch          |
| (476590) | * | 691 | 2008-09-19 | 691 | Kitt Peak     | Spacewatch          |
| (476714) | * | 691 | 2002-02-10 | 704 | Socorro       | LINEAR              |
| (476717) | * | 704 | 2008-10-10 | 703 | Catalina      | CSS                 |
| (476864) | * | 691 | 2008-10-20 | 691 | Kitt Peak     | Spacewatch          |
| (476866) | * | 703 | 2008-10-24 | 703 | Catalina      | CSS                 |
| (476964) | * | J75 | 2008-12-04 | 691 | Kitt Peak     | Spacewatch          |
| (476998) | * | 691 | 2008-12-22 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (477019) | * | 691 | 2008-12-21 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (477037) | * | 691 | 2008-12-21 | G96 | Mount Lemmon  | Mount Lemmon Survey |
| (477288) | * | 691 | 2009-09-20 | 691 | Kitt Peak     | Spacewatch          |
| (477337) | * | G96 | 2003-01-05 | 291 | Kitt Peak     | Spacewatch          |

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|----------|---|-----|------------|-----|---------------|----------------------|
| (477399) | * | J75 | 2009-11-12 | J75 | La Sagra      | OAM                  |
| (477451) | * | 691 | 2009-11-09 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477485) | * | 300 | 2005-11-06 | 691 | Kitt Peak     | Spacewatch           |
| (477516) | * | C51 | 2010-05-04 | E12 | Siding Spring | Siding Spring Survey |
| (477524) | * | G96 | 2010-03-13 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477525) | * | G96 | 2010-03-12 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477529) | * | 691 | 2010-03-13 | 691 | Kitt Peak     | Spacewatch           |
| (477559) | * | 691 | 2010-04-08 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477568) | * | G96 | 2010-04-11 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477570) | * | 703 | 2010-04-08 | 703 | Catalina      | CSS                  |
| (477588) | * | C51 | 2010-05-13 | E12 | Siding Spring | Siding Spring Survey |
| (477590) | * | C51 | 2010-05-20 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477600) | * | C51 | 2010-05-16 | C51 | WISE          | WISE                 |
| (477612) | * | C51 | 2010-05-30 | C51 | WISE          | WISE                 |
| (477648) | * | C51 | 2010-06-27 | C51 | WISE          | WISE                 |
| (477649) | * | C51 | 2014-04-08 | F51 | Haleakala     | Pan-STARRS 1         |
| (477661) | * | C51 | 2010-07-11 | C51 | WISE          | WISE                 |
| (477669) | * | C51 | 2003-10-16 | 291 | Kitt Peak     | Spacewatch           |
| (477675) | * | C51 | 2010-05-04 | 691 | Kitt Peak     | Spacewatch           |
| (477682) | * | 704 | 2006-12-21 | 691 | Kitt Peak     | Spacewatch           |
| (477684) | * | 704 | 2010-09-04 | J75 | La Sagra      | OAM                  |
| (477701) | * | G96 | 2005-11-28 | 703 | Catalina      | CSS                  |
| (477723) | * | 691 | 2010-07-10 | C51 | WISE          | WISE                 |
| (477785) | * | G96 | 2008-03-28 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477808) | * | 691 | 2004-03-17 | 691 | Kitt Peak     | Spacewatch           |
| (477816) | * | 703 | 2009-11-09 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477896) | * | G96 | 2011-05-08 | 703 | Catalina      | CSS                  |
| (477934) | * | F51 | 2000-09-27 | 704 | Socorro       | LINEAR               |
| (477939) | * | F51 | 2009-01-29 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (477966) | * | G96 | 2008-01-11 | 691 | Kitt Peak     | Spacewatch           |
| (477993) | * | F51 | 1995-10-22 | 691 | Kitt Peak     | Spacewatch           |
| (478011) | * | 691 | 2000-09-24 | 691 | Kitt Peak     | Spacewatch           |
| (478015) | * | 704 | 2011-09-26 | F51 | Haleakala     | Pan-STARRS 1         |
| (478044) | * | 691 | 1995-10-20 | 691 | Kitt Peak     | Spacewatch           |
| (478052) | * | 141 | 2005-04-02 | 691 | Kitt Peak     | Spacewatch           |
| (478059) | * | G96 | 2011-09-22 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (478076) | * | 691 | 2006-11-27 | 691 | Kitt Peak     | Spacewatch           |
| (478096) | * | 691 | 2011-10-18 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (478119) | * | 691 | 2011-10-20 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (478129) | * | G96 | 2010-05-15 | C51 | WISE          | WISE                 |
| (478137) | * | 691 | 2011-10-20 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (478142) | * | F51 | 2005-10-01 | 703 | Catalina      | CSS                  |
| (478156) | * | B01 | 2000-05-01 | 691 | Kitt Peak     | Spacewatch           |
| (478183) | * | G96 | 2010-04-29 | C51 | WISE          | WISE                 |
| (478250) | * | G96 | 1995-09-30 | 691 | Kitt Peak     | Spacewatch           |
| (478264) | * | 691 | 2006-11-19 | 691 | Kitt Peak     | Spacewatch           |
| (478301) | * | G96 | 2000-09-28 | 699 | Anderson Mesa | LONEOS               |
| (478309) | * | 300 | 2010-04-14 | C51 | WISE          | WISE                 |
| (478323) | * | 691 | 2010-05-30 | C51 | WISE          | WISE                 |
| (478324) | * | 691 | 2011-11-23 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (478327) | * | G96 | 2008-02-28 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (478328) | * | G96 | 2008-02-28 | G96 | Mount Lemmon  | Mount Lemmon Survey  |
| (478348) | * | 691 | 2010-05-08 | C51 | WISE          | WISE                 |
| (478353) | * | 141 | 2007-12-17 | 691 | Kitt Peak     | Spacewatch           |
| (478361) | * | G96 | 2010-07-28 | C51 | WISE          | WISE                 |

|          |   |     |            |     |                  |                      |
|----------|---|-----|------------|-----|------------------|----------------------|
| (478369) | * | 691 | 2010-07-18 | C51 | WISE             | WISE                 |
| (478450) | * | E12 | 2012-05-30 | E12 | Siding Spring    | Siding Spring Survey |
| (478470) | * | 691 | 2005-11-06 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (478471) | * | 691 | 2001-09-19 | 691 | Kitt Peak        | Spacewatch           |
| (478506) | * | 691 | 2012-09-17 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (478557) | * | G96 | 2008-07-29 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (478619) | * | F51 | 2012-09-15 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (478638) | * | 691 | 1995-09-20 | 691 | Kitt Peak        | Spacewatch           |
| (478739) | * | F51 | 2004-09-23 | 691 | Kitt Peak        | Spacewatch           |
| (478745) | * | G96 | 1995-10-22 | 691 | Kitt Peak        | Spacewatch           |
| (478766) | * | G96 | 2006-05-20 | 691 | Kitt Peak        | Spacewatch           |
| (478771) | * | F51 | 2010-04-17 | E12 | Siding Spring    | Siding Spring Survey |
| (478782) | * | 461 | 2010-05-03 | C51 | WISE             | WISE                 |
| (478834) | * | G96 | 2006-12-19 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (478919) | * | G96 | 2009-01-16 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (478937) | * | G96 | 2012-11-07 | 691 | Kitt Peak        | Spacewatch           |
| (478948) | * | G96 | 2010-03-18 | 691 | Kitt Peak        | Spacewatch           |
| (478988) | * | F51 | 2006-10-20 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479004) | * | G96 | 2012-11-14 | 691 | Kitt Peak        | Spacewatch           |
| (479054) | * | 691 | 2008-03-09 | 703 | Catalina         | CSS                  |
| (479062) | * | 621 | 2007-09-13 | 703 | Catalina         | CSS                  |
| (479069) | * | J04 | 2006-10-03 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479119) | * | G96 | 2007-10-15 | 291 | Kitt Peak        | Spacewatch           |
| (479143) | * | 691 | 2013-01-18 | 691 | Kitt Peak        | Spacewatch           |
| (479188) | * | F51 | 2012-12-08 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479217) | * | F51 | 2010-09-29 | 691 | Kitt Peak        | Spacewatch           |
| (479249) | * | F51 | 2010-06-08 | C51 | WISE             | WISE                 |
| (479369) | * | D03 | 1995-10-28 | 691 | Kitt Peak        | Spacewatch           |
| (479399) | * | G96 | 2013-09-17 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479420) | * | 691 | 2000-03-25 | 691 | Kitt Peak        | Spacewatch           |
| (479427) | * | 691 | 2007-03-09 | 703 | Catalina         | CSS                  |
| (479445) | * | 691 | 2003-04-08 | 691 | Kitt Peak        | Spacewatch           |
| (479451) | * | F51 | 2010-03-12 | C51 | WISE             | WISE                 |
| (479498) | * | G96 | 2005-03-16 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479530) | * | G96 | 2001-10-11 | 644 | Palomar          | NEAT                 |
| (479542) | * | G96 | 2010-03-12 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479559) | * | G96 | 1997-08-06 | 910 | Caussols         | ODAS                 |
| (479590) | * | F51 | 2010-05-31 | C51 | WISE             | WISE                 |
| (479603) | * | G96 | 2010-02-15 | C51 | WISE             | WISE                 |
| (479611) | * | I41 | 2007-04-22 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479616) | * | G96 | 2006-01-26 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479670) | * | F51 | 2004-11-11 | 683 | Goodricke-Pigott | R. A. Tucker         |
| (479677) | * | Q63 | 1996-02-10 | 691 | Kitt Peak        | Spacewatch           |
| (479739) | * | F51 | 2008-10-21 | D35 | Lulin            | LUSS                 |
| (479754) | * | 691 | 2007-10-11 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479774) | * | 691 | 2008-01-12 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479775) | * | 691 | 2005-03-04 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479786) | * | G96 | 2004-12-19 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479883) | * | G96 | 1995-10-01 | 691 | Kitt Peak        | Spacewatch           |
| (479903) | * | W84 | 2000-09-24 | 691 | Kitt Peak        | Spacewatch           |
| (479909) | * | G96 | 2005-11-04 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479916) | * | W84 | 2011-10-25 | F51 | Haleakala        | Pan-STARRS 1         |
| (479946) | * | F51 | 2012-10-08 | G96 | Mount Lemmon     | Mount Lemmon Survey  |
| (479990) | * | F51 | 2000-05-01 | 691 | Kitt Peak        | Spacewatch           |
| (659836) | * | V00 | 2021-03-20 | V00 | Kitt Peak        | Bok NEO Survey       |

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| (679835) | * | V00 | 2021-03-23 | V00 | Kitt Peak     | Bok NEO Survey            |
| (679994) | * | V00 | 2022-10-27 | V00 | Kitt Peak     | Bok NEO Survey            |
| (679995) | * | V00 | 2022-12-22 | V00 | Kitt Peak     | Bok NEO Survey            |
| (691028) | * | F51 | 2014-07-27 | F51 | Haleakala     | Pan-STARRS 1              |
| (691143) | * | F51 | 2013-04-16 | W84 | Cerro Tololo  | DECam                     |
| (691184) | * | F51 | 2010-09-18 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (691274) | * | F51 | 2009-09-15 | 691 | Kitt Peak     | Spacewatch                |
| (691410) | * | F51 | 2010-10-10 | I41 | Palomar       | Palomar Transient Factory |
| (691413) | * | F51 | 2010-11-27 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (691448) | * | F51 | 2014-08-20 | F51 | Haleakala     | Pan-STARRS 1              |
| (691467) | * | F51 | 2014-07-05 | F51 | Haleakala     | Pan-STARRS 1              |
| (691515) | * | F51 | 2014-08-20 | F51 | Haleakala     | Pan-STARRS 1              |
| (691536) | * | F51 | 2014-06-29 | F51 | Haleakala     | Pan-STARRS 1              |
| (691544) | * | F51 | 2013-04-16 | W84 | Cerro Tololo  | DECam                     |
| (691554) | * | F51 | 2013-04-15 | F51 | Haleakala     | Pan-STARRS 1              |
| (691650) | * | F51 | 1998-09-19 | 645 | Apache Point  | Sloan Digital Sky Survey  |
| (691716) | * | F51 | 2014-08-31 | F51 | Haleakala     | Pan-STARRS 1              |
| (691817) | * | G96 | 2008-04-15 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (691857) | * | G96 | 2013-04-16 | W84 | Cerro Tololo  | DECam                     |
| (691914) | * | F51 | 2013-04-10 | F51 | Haleakala     | Pan-STARRS 1              |
| (691988) | * | F51 | 2013-04-19 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (691994) | * | F51 | 2008-09-23 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692000) | * | F51 | 2010-12-06 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692047) | * | G96 | 2014-09-24 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692070) | * | F51 | 2002-08-18 | 644 | Palomar       | NEAT                      |
| (692076) | * | F51 | 2003-10-22 | 691 | Kitt Peak     | Spacewatch                |
| (692160) | * | G96 | 2009-11-09 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692173) | * | 691 | 2009-12-11 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692185) | * | 691 | 2014-10-17 | 691 | Kitt Peak     | Spacewatch                |
| (692214) | * | G45 | 2013-07-01 | F51 | Haleakala     | Pan-STARRS 1              |
| (692259) | * | G96 | 2008-09-23 | 691 | Kitt Peak     | Spacewatch                |
| (692399) | * | F51 | 2014-11-22 | F51 | Haleakala     | Pan-STARRS 1              |
| (692407) | * | F51 | 2014-10-29 | F51 | Haleakala     | Pan-STARRS 1              |
| (692533) | * | F51 | 2004-02-11 | 691 | Kitt Peak     | Spacewatch                |
| (692552) | * | F51 | 2007-09-13 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692607) | * | F51 | 2015-01-13 | F51 | Haleakala     | Pan-STARRS 1              |
| (692679) | * | F51 | 2011-06-06 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692706) | * | F51 | 2008-06-25 | E12 | Siding Spring | Siding Spring Survey      |
| (692711) | * | G96 | 2002-10-29 | 644 | Palomar       | NEAT                      |
| (692753) | * | F51 | 1999-03-20 | 645 | Apache Point  | Sloan Digital Sky Survey  |
| (692793) | * | F51 | 2000-04-02 | 691 | Kitt Peak     | Spacewatch                |
| (692824) | * | F51 | 2006-07-21 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692836) | * | F51 | 2011-04-12 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692856) | * | F51 | 2015-01-20 | F51 | Haleakala     | Pan-STARRS 1              |
| (692868) | * | F51 | 2007-10-30 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (692877) | * | F51 | 2009-08-16 | 691 | Kitt Peak     | Spacewatch                |
| (692926) | * | F51 | 2011-01-27 | 691 | Kitt Peak     | Spacewatch                |
| (693005) | * | F51 | 2011-03-09 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (693010) | * | F51 | 2015-02-16 | F51 | Haleakala     | Pan-STARRS 1              |
| (693023) | * | F51 | 2015-01-22 | F51 | Haleakala     | Pan-STARRS 1              |
| (693096) | * | W84 | 2015-02-17 | W84 | Cerro Tololo  | DECam                     |
| (693400) | * | F51 | 2015-03-17 | F51 | Haleakala     | Pan-STARRS 1              |
| (693456) | * | G96 | 2008-09-26 | 691 | Kitt Peak     | Spacewatch                |
| (693498) | * | F51 | 2009-09-18 | G96 | Mount Lemmon  | Mount Lemmon Survey       |
| (693574) | * | W84 | 2015-04-23 | F51 | Haleakala     | Pan-STARRS 1              |

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| (693577) | * | W84 | 2015-04-18 | W84 | Cerro Tololo | DECam                        |
| (693578) | * | W84 | 2015-04-18 | W84 | Cerro Tololo | DECam                        |
| (693580) | * | W84 | 2015-04-18 | W84 | Cerro Tololo | DECam                        |
| (693584) | * | W84 | 2015-04-18 | W84 | Cerro Tololo | DECam                        |
| (693605) | * | F51 | 2001-05-24 | 645 | Apache Point | Sloan Digital Sky Survey     |
| (693706) | * | F51 | 2015-05-21 | F51 | Haleakala    | Pan-STARRS 1                 |
| (693724) | * | W84 | 2015-05-20 | W84 | Cerro Tololo | DECam                        |
| (693727) | * | W84 | 2015-06-18 | F51 | Haleakala    | Pan-STARRS 1                 |
| (693728) | * | W84 | 2015-05-20 | W84 | Cerro Tololo | DECam                        |
| (693729) | * | W84 | 2015-05-19 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (693730) | * | F51 | 2019-04-02 | 691 | Kitt Peak    | Spacewatch                   |
| (693731) | * | W84 | 2015-05-20 | W84 | Cerro Tololo | DECam                        |
| (693732) | * | W84 | 2013-11-28 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (693734) | * | W84 | 2015-05-21 | W84 | Cerro Tololo | DECam                        |
| (693735) | * | W84 | 2015-05-20 | W84 | Cerro Tololo | DECam                        |
| (693736) | * | W84 | 2015-05-20 | W84 | Cerro Tololo | DECam                        |
| (693738) | * | F51 | 2013-11-09 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (693768) | * | F51 | 2012-10-16 | 691 | Kitt Peak    | Spacewatch                   |
| (693861) | * | F51 | 2009-06-22 | F51 | Haleakala    | Pan-STARRS 1                 |
| (693881) | * | F51 | 2011-09-21 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (693994) | * | F51 | 2015-08-10 | F51 | Haleakala    | Pan-STARRS 1                 |
| (694062) | * | F51 | 2011-09-04 | F51 | Haleakala    | Pan-STARRS 1                 |
| (694094) | * | F51 | 2015-06-23 | F51 | Haleakala    | Pan-STARRS 1                 |
| (694114) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam                        |
| (694230) | * | F51 | 2014-04-05 | F51 | Haleakala    | Pan-STARRS 1                 |
| (694244) | * | F51 | 2003-10-20 | 691 | Kitt Peak    | Spacewatch                   |
| (694245) | * | F51 | 2012-03-15 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (694252) | * | F51 | 2011-04-01 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (694337) | * | F51 | 2012-02-26 | F51 | Haleakala    | Pan-STARRS 1                 |
| (694360) | * | F51 | 2006-09-15 | 691 | Kitt Peak    | Spacewatch                   |
| (694396) | * | F51 | 2013-04-16 | W84 | Cerro Tololo | DECam                        |
| (694563) | * | F51 | 2015-08-09 | F51 | Haleakala    | Pan-STARRS 1                 |
| (694579) | * | G96 | 2011-10-26 | F51 | Haleakala    | Pan-STARRS 1                 |
| (694712) | * | G45 | 2005-12-24 | 691 | Kitt Peak    | Spacewatch                   |
| (694718) | * | G45 | 2015-10-10 | G45 | Atom Site    | Space Surveillance Telescope |
| (694782) | * | G45 | 2015-10-12 | G45 | Atom Site    | Space Surveillance Telescope |
| (694799) | * | G96 | 2004-01-18 | 691 | Kitt Peak    | Spacewatch                   |
| (694869) | * | F51 | 2015-10-10 | F51 | Haleakala    | Pan-STARRS 1                 |
| (694936) | * | G96 | 2015-10-03 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (694942) | * | G96 | 2006-11-27 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (694959) | * | F51 | 2007-02-23 | 691 | Kitt Peak    | Spacewatch                   |
| (695056) | * | F51 | 2015-09-12 | F51 | Haleakala    | Pan-STARRS 1                 |
| (695136) | * | F51 | 2014-07-03 | F51 | Haleakala    | Pan-STARRS 1                 |
| (695212) | * | G96 | 2015-11-03 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (695224) | * | G96 | 2006-10-21 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (695256) | * | B74 | 2004-08-20 | 691 | Kitt Peak    | Spacewatch                   |
| (695312) | * | F51 | 2013-04-17 | W84 | Cerro Tololo | DECam                        |
| (695323) | * | F51 | 2015-12-01 | F51 | Haleakala    | Pan-STARRS 1                 |
| (695352) | * | F51 | 1998-09-19 | 645 | Apache Point | Sloan Digital Sky Survey     |
| (695475) | * | F51 | 2003-10-22 | 645 | Apache Point | Sloan Digital Sky Survey     |
| (695614) | * | F51 | 2012-04-29 | 691 | Kitt Peak    | Spacewatch                   |
| (695638) | * | F51 | 2014-10-03 | G96 | Mount Lemmon | Mount Lemmon Survey          |
| (695769) | * | F51 | 2000-03-03 | 645 | Apache Point | Sloan Digital Sky Survey     |
| (695812) | * | G96 | 2016-01-07 | F51 | Haleakala    | Pan-STARRS 1                 |
| (695875) | * | F51 | 2016-01-17 | F51 | Haleakala    | Pan-STARRS 1                 |

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|          |   |     |            |     |                        |                              |
|----------|---|-----|------------|-----|------------------------|------------------------------|
| (695884) | * | F51 | 2006-02-27 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (695893) | * | F51 | 2009-02-20 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (695933) | * | F51 | 2013-09-01 | F51 | Haleakala              | Pan-STARRS 1                 |
| (695965) | * | F51 | 2011-11-24 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (696077) | * | G96 | 2011-03-02 | 691 | Kitt Peak              | Spacewatch                   |
| (696078) | * | F51 | 2007-09-05 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (696100) | * | F51 | 2006-07-23 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (696147) | * | F51 | 2004-01-28 | 691 | Kitt Peak              | Spacewatch                   |
| (696150) | * | F51 | 2007-10-09 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (696153) | * | F51 | 2014-11-17 | F51 | Haleakala              | Pan-STARRS 1                 |
| (696163) | * | G96 | 2013-08-15 | F51 | Haleakala              | Pan-STARRS 1                 |
| (696240) | * | W84 | 2016-03-28 | W84 | Cerro Tololo           | DECam                        |
| (696280) | * | F51 | 2006-01-31 | 691 | Kitt Peak              | Spacewatch                   |
| (696394) | * | G96 | 2012-02-21 | 691 | Kitt Peak              | Spacewatch                   |
| (696410) | * | F51 | 2016-05-27 | F51 | Haleakala              | Pan-STARRS 1                 |
| (696487) | * | G45 | 2016-07-03 | G45 | Atom Site              | Space Surveillance Telescope |
| (696490) | * | F51 | 2008-02-12 | 691 | Kitt Peak              | Spacewatch                   |
| (696551) | * | F51 | 2016-07-05 | F51 | Haleakala              | Pan-STARRS 1                 |
| (696605) | * | F51 | 2012-09-25 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (696682) | * | F51 | 2016-08-03 | F51 | Haleakala              | Pan-STARRS 1                 |
| (696744) | * | G96 | 2012-09-25 | G84 | Mount Lemmon SkyCenter | T. Vorobjov, A. Kostin       |
| (696760) | * | G96 | 2016-08-28 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (696897) | * | F51 | 2016-09-27 | F51 | Haleakala              | Pan-STARRS 1                 |
| (696943) | * | G96 | 2002-10-29 | 644 | Palomar                | NEAT                         |
| (696955) | * | G96 | 2005-07-05 | 691 | Kitt Peak              | Spacewatch                   |
| (696993) | * | F51 | 2016-10-07 | F51 | Haleakala              | Pan-STARRS 1                 |
| (697064) | * | F51 | 2014-04-23 | W84 | Cerro Tololo           | DECam                        |
| (697078) | * | F51 | 2014-04-23 | W84 | Cerro Tololo           | DECam                        |
| (697103) | * | G96 | 2016-10-21 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (697160) | * | G96 | 2012-12-23 | F51 | Haleakala              | Pan-STARRS 1                 |
| (697230) | * | G96 | 2013-06-17 | W84 | Cerro Tololo           | DECam                        |
| (697238) | * | F51 | 2015-10-08 | F51 | Haleakala              | Pan-STARRS 1                 |
| (697282) | * | F51 | 2017-01-26 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (697355) | * | F51 | 2013-02-17 | 691 | Kitt Peak              | Spacewatch                   |
| (697387) | * | F51 | 2014-08-31 | F51 | Haleakala              | Pan-STARRS 1                 |
| (697409) | * | G96 | 2014-03-07 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (697641) | * | G96 | 2015-12-09 | F51 | Haleakala              | Pan-STARRS 1                 |
| (697669) | * | 691 | 2014-07-30 | 691 | Kitt Peak              | Spacewatch                   |
| (697679) | * | G96 | 2017-01-26 | F51 | Haleakala              | Pan-STARRS 1                 |
| (697708) | * | G96 | 2014-08-23 | F51 | Haleakala              | Pan-STARRS 1                 |
| (697765) | * | G96 | 2009-11-24 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (697791) | * | G96 | 2006-05-06 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (697797) | * | F51 | 2008-10-09 | 703 | Catalina               | CSS                          |
| (697811) | * | F51 | 2007-12-04 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (697838) | * | F51 | 2003-09-26 | 645 | Apache Point           | Sloan Digital Sky Survey     |
| (697839) | * | W84 | 2016-03-28 | W84 | Cerro Tololo           | DECam                        |
| (697880) | * | F51 | 2016-05-03 | W84 | Cerro Tololo           | DECam                        |
| (697938) | * | G96 | 2016-03-29 | W84 | Cerro Tololo           | DECam                        |
| (697949) | * | F51 | 2013-07-14 | F51 | Haleakala              | Pan-STARRS 1                 |
| (698012) | * | F51 | 2016-05-01 | W84 | Cerro Tololo           | DECam                        |
| (698136) | * | F51 | 2016-05-03 | W84 | Cerro Tololo           | DECam                        |
| (698155) | * | G96 | 2015-04-19 | W84 | Cerro Tololo           | DECam                        |
| (698165) | * | G96 | 2015-04-19 | W84 | Cerro Tololo           | DECam                        |
| (698177) | * | G96 | 2015-04-19 | G96 | Mount Lemmon           | Mount Lemmon Survey          |

|          |   |     |            |     |              |                          |
|----------|---|-----|------------|-----|--------------|--------------------------|
| (698182) | * | G96 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698188) | * | G96 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698214) | * | G96 | 2015-04-19 | W84 | Cerro Tololo | DECam                    |
| (698215) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698220) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698223) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698226) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698231) | * | F51 | 2017-10-28 | F51 | Haleakala    | Pan-STARRS 1             |
| (698243) | * | F51 | 2015-04-19 | G96 | Mount Lemmon | Mount Lemmon Survey      |
| (698253) | * | 309 | 2015-04-19 | W84 | Cerro Tololo | DECam                    |
| (698256) | * | 309 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698258) | * | G96 | 2015-04-14 | G96 | Mount Lemmon | Mount Lemmon Survey      |
| (698263) | * | F51 | 2017-11-13 | F51 | Haleakala    | Pan-STARRS 1             |
| (698290) | * | G96 | 2015-04-20 | F51 | Haleakala    | Pan-STARRS 1             |
| (698291) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698292) | * | F51 | 2015-05-20 | W84 | Cerro Tololo | DECam                    |
| (698297) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698303) | * | G96 | 2014-04-28 | W84 | Cerro Tololo | DECam                    |
| (698311) | * | F51 | 2015-05-20 | W84 | Cerro Tololo | DECam                    |
| (698312) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698318) | * | F51 | 2016-08-01 | F51 | Haleakala    | Pan-STARRS 1             |
| (698338) | * | F51 | 2015-04-19 | G96 | Mount Lemmon | Mount Lemmon Survey      |
| (698351) | * | 691 | 2003-10-22 | 645 | Apache Point | Sloan Digital Sky Survey |
| (698379) | * | 691 | 2014-04-28 | W84 | Cerro Tololo | DECam                    |
| (698381) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698391) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam                    |
| (698402) | * | F51 | 2014-04-28 | W84 | Cerro Tololo | DECam                    |
| (698403) | * | G96 | 2014-05-06 | F51 | Haleakala    | Pan-STARRS 1             |
| (698440) | * | F51 | 2014-04-28 | W84 | Cerro Tololo | DECam                    |
| (698449) | * | F51 | 2014-06-02 | F51 | Haleakala    | Pan-STARRS 1             |
| (698452) | * | F51 | 2018-01-15 | F51 | Haleakala    | Pan-STARRS 1             |
| (698474) | * | F51 | 2014-05-05 | W84 | Cerro Tololo | DECam                    |
| (698479) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam                    |
| (698485) | * | G96 | 2014-04-23 | W84 | Cerro Tololo | DECam                    |
| (698502) | * | F51 | 2014-05-20 | F51 | Haleakala    | Pan-STARRS 1             |
| (698537) | * | F51 | 2014-04-28 | W84 | Cerro Tololo | DECam                    |
| (698592) | * | F51 | 2018-02-21 | F51 | Haleakala    | Pan-STARRS 1             |
| (698656) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam                    |
| (698732) | * | W93 | 2002-08-29 | 644 | Palomar      | NEAT                     |
| (698768) | * | G96 | 2016-03-27 | W84 | Cerro Tololo | DECam                    |
| (698776) | * | D29 | 2011-10-20 | G96 | Mount Lemmon | Mount Lemmon Survey      |
| (698872) | * | F51 | 2015-04-21 | W84 | Cerro Tololo | DECam                    |
| (698873) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698910) | * | F51 | 2015-01-31 | F51 | Haleakala    | Pan-STARRS 1             |
| (698934) | * | F51 | 2015-05-11 | G96 | Mount Lemmon | Mount Lemmon Survey      |
| (698964) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698967) | * | F52 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698969) | * | F51 | 2015-04-19 | W84 | Cerro Tololo | DECam                    |
| (698970) | * | G96 | 2015-05-20 | W84 | Cerro Tololo | DECam                    |
| (698971) | * | G96 | 2015-04-18 | W84 | Cerro Tololo | DECam                    |
| (698973) | * | G96 | 2019-02-26 | G96 | Mount Lemmon | Mount Lemmon Survey      |
| (698982) | * | G96 | 2014-05-08 | F51 | Haleakala    | Pan-STARRS 1             |
| (699001) | * | G96 | 2014-04-23 | W84 | Cerro Tololo | DECam                    |
| (699004) | * | G96 | 2015-05-10 | G96 | Mount Lemmon | Mount Lemmon Survey      |
| (699026) | * | F51 | 2015-06-18 | F51 | Haleakala    | Pan-STARRS 1             |

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|          |   |     |            |     |              |                     |
|----------|---|-----|------------|-----|--------------|---------------------|
| (699052) | * | F51 | 2014-05-23 | F51 | Haleakala    | Pan-STARRS 1        |
| (699066) | * | F51 | 2014-04-25 | W84 | Cerro Tololo | DECam               |
| (699067) | * | F51 | 2014-04-28 | W84 | Cerro Tololo | DECam               |
| (699090) | * | F51 | 2019-04-05 | F51 | Haleakala    | Pan-STARRS 1        |
| (699096) | * | G96 | 2014-05-23 | F51 | Haleakala    | Pan-STARRS 1        |
| (699100) | * | F51 | 2015-05-21 | W84 | Cerro Tololo | DECam               |
| (699113) | * | F51 | 2015-05-20 | W84 | Cerro Tololo | DECam               |
| (699119) | * | F51 | 2014-04-10 | F51 | Haleakala    | Pan-STARRS 1        |
| (699122) | * | F51 | 2019-04-05 | F51 | Haleakala    | Pan-STARRS 1        |
| (699144) | * | F51 | 2010-04-10 | G96 | Mount Lemmon | Mount Lemmon Survey |
| (699146) | * | F51 | 2014-05-27 | F51 | Haleakala    | Pan-STARRS 1        |
| (699191) | * | F51 | 2015-05-20 | W84 | Cerro Tololo | DECam               |
| (699209) | * | F51 | 2014-04-29 | F51 | Haleakala    | Pan-STARRS 1        |
| (699211) | * | F51 | 2019-05-07 | F51 | Haleakala    | Pan-STARRS 1        |
| (699219) | * | F51 | 2014-04-05 | F51 | Haleakala    | Pan-STARRS 1        |
| (699225) | * | F51 | 2019-05-01 | F51 | Haleakala    | Pan-STARRS 1        |
| (699226) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam               |
| (699254) | * | F51 | 2010-07-26 | C51 | WISE         | WISE                |
| (699255) | * | F51 | 2019-05-27 | F51 | Haleakala    | Pan-STARRS 1        |
| (699277) | * | F51 | 2019-05-31 | F51 | Haleakala    | Pan-STARRS 1        |
| (699316) | * | W84 | 2019-07-04 | W84 | Cerro Tololo | DECam               |
| (699333) | * | W84 | 2019-08-02 | W84 | Cerro Tololo | DECam               |
| (699337) | * | J04 | 2011-10-25 | F51 | Haleakala    | Pan-STARRS 1        |
| (699341) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam               |
| (699365) | * | F51 | 2019-10-23 | F51 | Haleakala    | Pan-STARRS 1        |
| (699401) | * | F52 | 2009-03-31 | G96 | Mount Lemmon | Mount Lemmon Survey |
| (699417) | * | V00 | 2020-02-29 | V00 | Kitt Peak    | Bok NEO Survey      |
| (699508) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam               |
| (699551) | * | F51 | 2020-05-14 | F51 | Haleakala    | Pan-STARRS 1        |
| (699563) | * | F51 | 2014-04-29 | F51 | Haleakala    | Pan-STARRS 1        |
| (699565) | * | F51 | 2014-04-28 | W84 | Cerro Tololo | DECam               |
| (699571) | * | F51 | 2020-05-20 | F51 | Haleakala    | Pan-STARRS 1        |
| (699573) | * | F51 | 2010-07-19 | C51 | WISE         | WISE                |
| (699579) | * | F52 | 2014-05-05 | W84 | Cerro Tololo | DECam               |
| (699580) | * | F51 | 2015-05-11 | G96 | Mount Lemmon | Mount Lemmon Survey |
| (699581) | * | F51 | 2015-05-20 | W84 | Cerro Tololo | DECam               |
| (699597) | * | F51 | 2014-04-28 | W84 | Cerro Tololo | DECam               |
| (699602) | * | F51 | 2020-06-29 | F51 | Haleakala    | Pan-STARRS 1        |
| (699607) | * | F51 | 2014-04-30 | F51 | Haleakala    | Pan-STARRS 1        |
| (699608) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam               |
| (699611) | * | F51 | 2020-07-28 | F51 | Haleakala    | Pan-STARRS 1        |
| (699648) | * | F51 | 2014-04-28 | W84 | Cerro Tololo | DECam               |
| (699684) | * | F51 | 2015-04-19 | W84 | Cerro Tololo | DECam               |
| (699706) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam               |
| (699721) | * | V00 | 2021-03-23 | V00 | Kitt Peak    | Bok NEO Survey      |
| (699724) | * | F51 | 2015-01-16 | F51 | Haleakala    | Pan-STARRS 1        |
| (699733) | * | F51 | 2019-10-09 | G96 | Mount Lemmon | Mount Lemmon Survey |
| (699754) | * | F51 | 2015-05-20 | W84 | Cerro Tololo | DECam               |
| (699782) | * | F51 | 2015-05-20 | W84 | Cerro Tololo | DECam               |
| (699784) | * | F51 | 2013-02-18 | G96 | Mount Lemmon | Mount Lemmon Survey |
| (699785) | * | F51 | 2015-06-11 | F51 | Haleakala    | Pan-STARRS 1        |
| (699788) | * | F51 | 2015-06-19 | F51 | Haleakala    | Pan-STARRS 1        |
| (699789) | * | F51 | 2015-04-18 | W84 | Cerro Tololo | DECam               |
| (699803) | * | F51 | 2014-04-23 | W84 | Cerro Tololo | DECam               |
| (699806) | * | F51 | 2015-05-20 | W84 | Cerro Tololo | DECam               |

|          |   |     |            |     |                        |                              |
|----------|---|-----|------------|-----|------------------------|------------------------------|
| (699815) | * | G96 | 2015-04-18 | W84 | Cerro Tololo           | DECam                        |
| (699821) | * | F51 | 2021-09-15 | F51 | Haleakala              | Pan-STARRS 1                 |
| (699827) | * | G96 | 2015-06-11 | F51 | Haleakala              | Pan-STARRS 1                 |
| (699830) | * | F51 | 2021-09-04 | F51 | Haleakala              | Pan-STARRS 1                 |
| (699840) | * | F52 | 2014-04-28 | W84 | Cerro Tololo           | DECam                        |
| (699847) | * | G96 | 2016-08-28 | G96 | Mount Lemmon           | Mount Lemmon Survey          |
| (699862) | * | F52 | 2015-04-18 | W84 | Cerro Tololo           | DECam                        |
| (699869) | * | F52 | 2015-05-20 | W84 | Cerro Tololo           | DECam                        |
| (699870) | * | F52 | 2015-05-20 | W84 | Cerro Tololo           | DECam                        |
| (699882) | * | V00 | 2021-10-03 | V00 | Kitt Peak              | Bok NEO Survey               |
| (699903) | * | F52 | 2021-10-04 | F52 | Haleakala              | Pan-STARRS 2                 |
| (699906) | * | F52 | 2014-04-28 | W84 | Cerro Tololo           | DECam                        |
| (699908) | * | F51 | 2014-05-23 | F51 | Haleakala              | Pan-STARRS 1                 |
| (699909) | * | F52 | 2014-05-05 | W84 | Cerro Tololo           | DECam                        |
| (699910) | * | V00 | 2021-10-02 | V00 | Kitt Peak              | Bok NEO Survey               |
| (699918) | * | F52 | 2014-04-05 | F51 | Haleakala              | Pan-STARRS 1                 |
| (699920) | * | F52 | 2020-04-21 | F51 | Haleakala              | Pan-STARRS 1                 |
| (699937) | * | V00 | 2021-10-28 | V00 | Kitt Peak              | Bok NEO Survey               |
| (699949) | * | F51 | 2015-09-12 | F51 | Haleakala              | Pan-STARRS 1                 |
| (699955) | * | F51 | 2021-11-26 | F51 | Haleakala              | Pan-STARRS 1                 |
| (699967) | * | F51 | 2014-04-24 | W84 | Cerro Tololo           | DECam                        |
| (699975) | * | F51 | 2014-04-28 | W84 | Cerro Tololo           | DECam                        |
| (699986) | * | F52 | 2014-04-23 | W84 | Cerro Tololo           | DECam                        |
| (699987) | * | F51 | 2014-04-23 | W84 | Cerro Tololo           | DECam                        |
| (699992) | * | 691 | 2006-01-27 | 691 | Kitt Peak              | Spacewatch                   |
| (711587) | * | W84 | 2014-05-02 | W84 | Cerro Tololo           | DECam                        |
| (714841) | * | D29 | 2011-08-27 | 114 | Zelenchukskaya Station | T. V. Kryachko, B. Satovskii |
| (715777) | * | F51 | 2010-10-31 | 461 | Piszkéstető            | Z. Kuli, K. Sárneczky        |
| (717022) | * | G45 | 2012-09-15 | D00 | Kislovodsk             | ISON-Kislovodsk Observatory  |
| (717245) | * | G96 | 2012-09-15 | D00 | Kislovodsk             | ISON-Kislovodsk Observatory  |
| (718492) | * | T09 | 2017-03-22 | T09 | Maunakea               | COIAS                        |
| (718862) | * | V06 | 2017-10-28 | V06 | Kitt Peak              | CSS                          |
| (718962) | * | F51 | 2015-05-14 | 309 | Cerro Paranal          | Gaia-GBOT                    |
| (719047) | * | W84 | 2015-09-09 | F51 | Haleakala              | Pan-STARRS 1                 |
| (719612) | * | T09 | 2019-10-27 | T09 | Maunakea               | COIAS                        |
| (719707) | * | F51 | 2007-02-22 | 290 | Mount Graham           | D. E. Trilling               |
| (719849) | * | V00 | 2021-03-20 | V00 | Kitt Peak              | Bok NEO Survey               |
| (719850) | * | V00 | 2021-03-20 | V00 | Kitt Peak              | Bok NEO Survey               |
| (719876) | * | V00 | 2021-07-09 | V00 | Kitt Peak              | Bok NEO Survey               |
| (719904) | * | F51 | 2014-05-21 | F51 | Haleakala              | Pan-STARRS 1                 |
| (719942) | * | V00 | 2021-10-27 | V00 | Kitt Peak              | Bok NEO Survey               |
| (719988) | * | V00 | 2022-11-05 | V00 | Kitt Peak              | Bok NEO Survey               |

## New Names of Minor Planets

The following new names of minor planets have been approved by the WGSBN. Discovery details, for information only, are given in the following order: date of discovery; discoverer(s) name(s); discovery site; discovery site observatory code. The discoverer(s) name(s) is/are followed by an asterisk if this is a change from what was published when the object was numbered.

### **(8015) Marksimons = 1990 QT<sub>2</sub>**

*Discovery: 1990-08-24 / H. E. Holt / Palomar / 675*

American geophysicist Mark Simons (b. 1967) is a Professor of Geophysics at the Seismological Laboratory of the Caltech. He has been instrumental in advancing the ability of space geodesy and utilizing technologies like interferometric synthetic aperture radar and global navigation satellite systems to measure geodynamic processes on Earth and beyond.

### **(19304) Yoshidaseiko = 1996 TQ<sub>1</sub>**

*Discovery: 1996-10-05 / K. Endate, K. Watanabe / Kitami / 400*

Seiko Yoshida (b. 1952) is a Japanese researcher in the history of astronomy. She is a member of the History of Science Society of Japan and an associate member of the Astronomical Society of Japan. Yoshida continues to study Kiyotsugu Hirayama, the discoverer of asteroid families.

### **(20054) Lágrimarios = 1993 FX<sub>37</sub>**

*Discovery: 1993-03-19 / UESAC / La Silla / 809*

Lidia Mabel Benavidez Tabárez (Lágrima Ríos, 1924–2006) was an Afro-Uruguayan singer who excelled in candombe and tango, the two representative genres of the Río de la Plata region. She promoted her art through many countries as a reference for Afro-Uruguayan culture, and was designated “Woman of the Year” in Montevideo in 2002.

### **(20055) Maríaespínola = 1993 FB<sub>47</sub>**

*Discovery: 1993-03-19 / UESAC / La Silla / 809*

María Espínola Espínola (1878–1963) was a Uruguayan teacher and supervisor who founded the first school of technical studies in San José de Mayo city. In 1921 she became a member of the Council of Normal and Primary Education, the highest post ever held by a woman in Uruguay up to that time. In 1922 she published the book *La escuela y el progreso*.

### **(27920) Noguchiujo = 1996 VV<sub>8</sub>**

*Discovery: 1996-11-07 / K. Endate, K. Watanabe / Kitami / 400*

Noguchi Ujo (1882–1945) was a Japanese poet and lyricist of Doyo (nursery rhymes) and Minyo (Japanese folk songs). Many of his works are still sung and loved throughout Japan today. He is one of the nation’s most famous poets.

**(28883) Kouveliotou = 2000 KS<sub>52</sub>**

*Discovery: 2000-05-24 / LONEOS / Anderson Mesa / 699*

Chryssa Kouveliotou (b. 1953) has been a leader in high energy astrophysics. Starting as a professor in her native Greece, she spent most of her career in the USA, working for NASA and, later, George Washington University. Using a succession of orbiting observatories, she has led discoveries on  $\gamma$ -ray bursters and confirmed the existence of magnetars.

**(47931) Stifler = 2000 GG<sub>167</sub>**

*Discovery: 2000-04-04 / LONEOS / Anderson Mesa / 699*

Lawrence Stifler (b. 1940) is an American philanthropist and founder of the Maine Mineral & Gem Museum. His devotion to teach and enrich the lives of others—especially children—has been boundless. The museum features the world's largest repository of Moon material as well as the largest samples from the Moon, Mars and (4) Vesta.

**(53088) Mauricehirsch = 1998 YF<sub>5</sub>**

*Discovery: 1998-12-18 / ODAS / Caussols / 910*

Maurice Hirsch (1902–1988) was a French teacher at the Lycée Bernard Palissy in Agen from 1930 to 1968. He taught physics and chemistry to dozens of classes of students, including Alain Aspect, winner of the 2022 Nobel Prize in Physics. Through Hirsch, all passionate physics and chemistry teachers are honored.

**(85439) Barbero = 1997 EP<sub>40</sub>**

*Discovery: 1997-03-13 / L. Tesi, G. Cattani / San Marcello / 104*

Alessandro Barbero (b. 1959) is an Italian historian and novelist. He is a specialist of the Middle Ages, the author of several novels, and winner of Italy's foremost literary award (Premio Strega, 1996). Barbero's work has contributed to enhancing historical consciousness among the general public in Italy, particularly the young.

**(98943) Torifune = 2001 CC<sub>21</sub>**

*Discovery: 2001-02-03 / LINEAR / Socorro / 704*

Torifune (an abbreviation of Ame-no-torifune) is a god in Japanese mythology. It is also the name of the god's ship, which can travel safely at high speed like a bird and steady as a rock. The Hayabusa2 spacecraft will perform a flyby of this asteroid, and the name expresses the hope that Hayabusa2 will be able to safely conduct the high-speed encounter.

**(101101) Carmichael = 1998 RO<sub>41</sub>**

*Discovery: 1998-09-14 / LINEAR / Socorro / 704*

Robert Daniel Carmichael (1879–1967) was an American mathematician known for his research in what are now called the Carmichael numbers, Carmichael's totient function conjecture, Carmichael's theorem, and the Carmichael function—all significant in number theory and in the study of the prime numbers. The smallest palindromic Carmichael number is 101101.

**(145491) Larakaufmann = 2005 VX<sub>108</sub>**

*Discovery: 2005-11-06 / Mount Lemmon Survey / Mount Lemmon / G96*

Lara L. Kaufmann (b. 1967) is Executive Director of the Greenville (South Carolina) Chautauqua Society, which provides cultural enrichment and enhanced community harmony over a broad geographic area.

**(160556) Greenaugh = 1998 RR<sub>4</sub>**

*Discovery: 1998-09-14 / LINEAR / Socorro / 704*

Kevin Greenaugh (1956–2023) was an American nuclear engineer, Assistant Deputy Administrator for Strategic Partnerships at the National Nuclear Security Administration, and adjunct professor at Howard University. For Planetary Defense, he co-founded the NASA/NNSA working group and co-authored the U.S. National Preparedness Strategy and Action Plan.

**(172937) Pattysieck = 2005 JS<sub>32</sub>**

*Discovery: 2005-05-04 / Mount Lemmon Survey / Mount Lemmon / G96*

Patty Alvarado Sieck (b. 1961) was an investigator for the State of Colorado Public Defenders Office for 23 years. There she worked to protect the rights and dignity of indigent people, and strove to ensure that the innocent were not punished for the crimes of others.

**(206265) Radian = 2002 XP<sub>115</sub>**

*Discovery: 2002-12-11 / LINEAR / Socorro / 704*

The radian is a unit of angle in the International System of Units (SI). One radian is the angle subtended at the center of a circle by an arc that is equal in length to the radius. To the nearest integer, the number of this minor planet is the number of arcseconds in a radian and, consequently, also the number of astronomical units in a parsec.

**(290180) Pattiekletter = 2005 RK<sub>48</sub>**

*Discovery: 2005-09-03 / CSS / Catalina / 703*

Born in Syracuse, New York, Patricia Kletter (1950–2024) was a talented artist and a generous teacher. She shared her love of ceramics and jewelry-making with the children of the Camp DeBaun summer camp in Oceanside, New York, and throughout her New York and Summerville, South Carolina, communities.

**(296820) Paju = 2009 WT<sub>7</sub>**

*Discovery: 2009-11-18 / M. Ory / Vicques / 185*

PAJU is the nickname of a very popular show on French-speaking Swiss television. *Passe-moi les jumelles* talks about nature in all its states: the earth, the sea, the sky and the cosmos.

**(364630) Shizuoka = 2007 TS<sub>70</sub>**

*Discovery: 2007-10-13 / R. Holmes \* / Charleston / H55*

Shizuoka City in Japan is rich in nature and faces the Pacific Ocean. Shizuoka Prefecture is home to Mount Fuji, a World Heritage site, and the pine forests of Miho-no-Matsubara, known for the legend of a heavenly maiden's robe of feathers descending from the sky. Name suggested by teacher Y. Yatsuyanagi and students from Shizuoka University, Japan.

**(604468) Olenici = 2015 QL<sub>15</sub>**

*Discovery: 2015-08-19 / EURONEAR \* / La Palma / 950*

Dimitrie Olenici (b. 1949) is a Romanian physicist who worked in astronomy outreach at Suceava Planetarium and his own planetarium in Horodnic de Jos village. He proposed a column representation of the Saros series and two new eclipse cycles, publishing books about eclipses, astronomical symbols in traditional ornamentation and Foucault pendulum experiments.

**(611494) Gionti = 2006 WV<sub>212</sub>**

*Discovery: 2014-05-18 / K. Černis, R. P. Boyle \* / Mount Graham / 290*

Gabriele Gionti (b. 1967), an Italian theoretical cosmologist and Jesuit priest, works at the Vatican Observatory. His research covers aspects of string theory, and quantum gravity as applied to the physics of the Big Bang. At the Vatican Observatory he has organized several international workshops on space-time singularities in honor of George Lemaitre.

**(635381) Michaelcoates = 2013 JH<sub>47</sub>**

*Discovery: 2013-04-11 / N. Falla / iTelescope / Q62*

Michael da Silva Coates (1942–2014) was a college friend of the discoverer. After graduating from St Andrews University in Scotland, he worked as a Clinical Psychologist helping countless children deal with the trauma of broken homes and abusive upbringing. He loved music and had a successful hobby recording choirs and orchestras in Canada and Shetland.

**(635478) Fotonikalv = 2013 RH<sub>24</sub>**

*Discovery: 2013-09-04 / K. Černis, I. Eglitis \* / Baldone / 069*

This object has been named in recognition of the achievements of National Science Platform FOTONIKA-LV at the University of Latvia. This program, founded in 2010, works towards the consolidation of quantum sciences, space sciences, and technologies, in order to boost national progress and to be a strong partner in international consortia.

**(650474) Chungchaocheng = 2012 MJ<sub>9</sub>**

*Discovery: 2008-08-29 / X. Y. Hsiao, Q.-z. Ye \* / Lulin / D35*

Chung Chao-Cheng (Hakka Chinese: Zung seu-ziin, 1925–2020), was known as the “Mother of Modern Taiwanese Literature”. He wrote literary works based on sympathy and humanitarianism, which represented the hearts and minds of Taiwanese people.

**(693043) Suhay = 2015 DC<sub>129</sub>**

*Discovery: 2013-09-08 / EURONEAR \* / La Palma / 950*

Erika Suhay (b. 1941) is a retired Romanian professor of mathematics and astronomy who graduated in Astronomy at the University of Bucharest. Very active in astronomy education and public outreach, member and president of the Bucharest Astroclub, she collaborated with the Ministry of Education, co-authoring manuals and organizing astronomy Olympiads.

**(709193) Concettafinardi = 2012 VF<sub>94</sub>**

*Discovery: 2012-11-13 / K. Černis, R. P. Boyle \* / Mount Graham / 290*

Sister Concetta (Lucia) Finardi (1896–1975), entered the Sisters of the Child Mary in 1916 and made her religious vows in Milan in 1917. From 1917 to 1921, she was one of the four nuns who carried out the cataloguing of 500 000 stars in the Vatican zone of the *Carte du Ciel* star atlas.

**(714305) Panceri = 2015 MP<sub>23</sub>**

*Discovery: 2011-09-27 / K. Černis, R. P. Boyle \* / Mount Graham / 290*

Sister Luigia (Carmelita Jacinta) Panceri (1893–1982), entered the Sisters of the Child Mary in 1915 and made her religious vows in Milan in 1917. From 1917 to 1921, she was one of the four nuns who carried out the cataloguing of 500 000 stars in the Vatican zone of the *Carte du Ciel* star atlas.

## Recent Comet Namings & Numberings

Recently-assigned comet names and numbering of periodic comets are listed below. The recently-assigned names list indicates, using an asterisk, any comet whose discovery is eligible for the Edgar Wilson Award, as well as the reference where the name first appears (this may not be the circular announcing the discovery, or the first appearance of a name if the name was modified subsequently). If a date appears as the reference, it refers to the date that a News note of a name change appeared on the WGSBN website. If a name contains accented characters, the approved ASCII-only version of the name is included between [...]: note that any print, PDF or web usage must use the proper accented form. Newly-numbered objects that are being accorded dual status are flagged as such.

### Recent Namings (in reverse chronological order)

|   |                       |
|---|-----------------------|
| C/2024 R4 (PANSTARRS)                                 | <i>MPEC 2024-S12</i>  |
| P/2024 R3 (PANSTARRS)                                 | <i>MPEC 2024-S11</i>  |
| C/2024 Q4 (PANSTARRS)                                 | <i>MPEC 2024-S10</i>  |
| P/2024 R2 (PANSTARRS)                                 | <i>MPEC 2024-R202</i> |
| P/2024 R1 (PANSTARRS)                                 | <i>MPEC 2024-R182</i> |
| C/2024 Q3 (PANSTARRS)                                 | <i>MPEC 2024-R181</i> |
| P/2024 Q1 (PANSTARRS)                                 | <i>MPEC 2024-Q87</i>  |
| P/2023 JN <sub>16</sub> (Lemmon)                      | <i>MPEC 2024-Q4</i>   |
| C/2023 TD <sub>22</sub> (Lemmon)                      | <i>MPEC 2024-P107</i> |
| P/2024 O2 (PANSTARRS)                                 | <i>MPEC 2024-P90</i>  |
| P/2024 N6 = P/2002 QU <sub>151</sub> (NEAT-PANSTARRS) | <i>MPEC 2024-P41</i>  |
| C/2024 O1 (PANSTARRS)                                 | <i>MPEC 2024-P21</i>  |
| C/2024 N4 (Sárneczky) [Sarneczky]                     | <i>MPEC 2024-O41</i>  |
| C/2024 M1 (ATLAS)                                     | <i>MPEC 2024-O20</i>  |
| C/2024 L5 (ATLAS)                                     | <i>MPEC 2024-O19</i>  |
| C/2024 N3 (Sárneczky) [Sarneczky]                     | <i>MPEC 2024-O11</i>  |
| P/2024 N2 = P/2010 T8 = P/2017 R2 (PANSTARRS)         | <i>MPEC 2024-N123</i> |
| C/2024 N1 (PANSTARRS)                                 | <i>MPEC 2024-N107</i> |
| P/2024 L4 (Rankin)                                    | <i>MPEC 2024-N106</i> |
| C/2024 L3 (PANSTARRS)                                 | <i>MPEC 2024-N105</i> |
| C/2024 L2 (PANSTARRS)                                 | <i>MPEC 2024-M24</i>  |
| P/2024 K1 (PANSTARRS)                                 | <i>MPEC 2024-L114</i> |
| C/2024 L1 (PANSTARRS)                                 | <i>MPEC 2024-L59</i>  |
| P/2024 FG <sub>9</sub> (Nanshan-Hahn) *               | <i>MPEC 2024-L4</i>   |
| C/2024 J4 (Lemmon)                                    | <i>MPEC 2024-K128</i> |
| C/2024 J3 (ATLAS)                                     | <i>MPEC 2024-K118</i> |
| C/2024 G7 (ATLAS)                                     | <i>MPEC 2024-K41</i>  |

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|   |                |
|---|----------------|
| C/2024 J2 (Wierzchoś) [Wierzchos]                       | MPEC 2024-K31  |
| C/2024 G6 (ATLAS)                                       | MPEC 2024-J134 |
| P/2024 J1 (PANSTARRS)                                   | MPEC 2024-J133 |
| C/2024 G5 (Leonard)                                     | MPEC 2024-J126 |
| C/2024 G4 (PANSTARRS)                                   | MPEC 2024-J123 |
| 485P/2022 U6 = P/2006 AH <sub>2</sub> (Sheppard-Tholen) | MPEC 2024-H65  |
| C/2024 G3 (ATLAS)                                       | MPEC 2024-H22  |
| C/2024 G2 (ATLAS)                                       | MPEC 2024-H20  |
| C/2024 G1 (Wierzchoś) [Wierzchos]                       | MPEC 2024-H10  |
| C/2024 F2 (PANSTARRS)                                   | MPEC 2024-G103 |
| P/2024 F1 (PANSTARRS)                                   | MPEC 2024-G102 |
| C/2024 E2 (Bok)   | MPEC 2024-F91  |
| C/2024 E1 (Wierzchoś) [Wierzchos]                       | MPEC 2024-E102 |
| C/2021 X2 (Bok)   | MPEC 2024-E8   |
| C/2019 O2 (PANSTARRS)                                   | MPEC 2024-E7   |
| C/2019 G2 (PANSTARRS)                                   | MPEC 2024-G1   |
| 484P/2005 XR <sub>132</sub> (Spacewatch)                | MPEC 2024-D135 |
| 482P/2014 VF <sub>40</sub> (PANSTARRS)                  | MPEC 2024-D133 |
| C/2023 X7 (PANSTARRS)                                   | MPEC 2024-D102 |
| C/2024 C4 (ATLAS)                                       | MPEC 2024-D98  |

**Recent Numberings**

|  |            |
|--|------------|
| 486P/2018 L5 = P/2024 H1 (Leonard)                           | MPC 174198 |
| 485P/2022 U6 = P/2006 AH <sub>2</sub> (Sheppard-Tholen)      | MPC 172941 |
| 484P/2005 XR <sub>132</sub> (Spacewatch)                     | MPC 172941 |
| 483P/2016 J1 = P/2010 M9 = P/2020 Y6 = P/2021 K5 (PANSTARRS) | MPC 171409 |
| 482P/2014 VF <sub>40</sub> (PANSTARRS)                       | MPC 171409 |
| 481P/2012 WA <sub>34</sub> = P/2024 C5 (Lemmon-PANSTARRS)    | MPC 171409 |
| 480P/2014 A3 = P/2023 X6 (PANSTARRS)                         | MPC 169139 |
| 479P/2011 NO <sub>1</sub> = P/2023 WM <sub>26</sub> (Elenin) | MPC 169139 |
| 478P/2023 Y3 = P/2017 BQ <sub>100</sub> (ATLAS)              | MPC 169139 |
| 477P/2018 P3 = P/2023 V8 (PANSTARRS)                         | MPC 169139 |
| 476P/2015 HG <sub>16</sub> = P/2023 W2 (PANSTARRS)           | MPC 169139 |
| 475P/2004 DO <sub>29</sub> = P/2023 V7 (Spacewatch-LINEAR)   | MPC 169139 |
| 474P/2023 S4 = P/2017 O4 (Hogan)                             | MPC 169139 |
| 473P/2001 Q6 = P/2023 W1 (NEAT)                              | MPC 169139 |
| 472P/2002 T6 = P/2023 RL <sub>75</sub> (NEAT-LINEAR)         | MPC 167069 |
| 471P/2023 KF <sub>3</sub> = P/2010 YK <sub>3</sub>           | MPC 164694 |
| 470P/2014 W1 = P/2023 O2 (PANSTARRS)                         | MPC 164694 |
| 469P/2015 XG <sub>422</sub> (PANSTARRS)                      | MPC 164694 |
| 468P/2004 V3 = P/2023 O1 (Siding Spring)                     | MPC 164694 |
| 467P/2010 TO <sub>20</sub> = P/2023 H6 (LINEAR-Grauer)       | MPC 164694 |

## Standard Acronyms & Abbreviations

The standard acronyms that may be used in citations without needing to be expanded are listed at:

<https://www.wgsbn-iau.org/documentation/AcronymsAndAbbreviations.html>.

## Statistics & Links

There are currently 24918 named minor planets.

Discoverers of minor planets may submit name proposals via the WGSBN voting website at:

<https://www.wgsbn-iau.org/cgi-bin/submission.py>

Registration is required to access this site. Requests for access should be made to [contact@wgsbn-iau.org](mailto:contact@wgsbn-iau.org).

The form for IAU members to express interest in being a Rotating Member of the WGSBN in future years is available at:

[https://www.wgsbn-iau.org/rotating\\_members.html](https://www.wgsbn-iau.org/rotating_members.html)

Archival copies of the *Bulletin*, as well as machine-readable datafiles of new names, citations and corrigenda from each issue, are available on the WGSBN website:

<https://www.wgsbn-iau.org/>

The *Bulletin* is also available from the Publications section of the IAU website:

<https://www.iau.org/publications/iau/wgsbn-bulletins/>

The email address for the WGSBN is [contact@wgsbn-iau.org](mailto:contact@wgsbn-iau.org)

## WGSBN Members

There are 15 members of the WGSBN, 11 of whom are voting members. The other four members, who are *ex-officio*, are the President and General Secretary of the IAU, and representatives for the IAU WG Planetary System Nomenclature and the IAU Minor Planet Center.

The current members of the WGSBN are listed below:

- Jana Tichá, Chair
- Keith Noll, Vice-Chair
- Gareth Williams, Secretary
- Yuliya Chernetenko
- Julio Fernández
- Daniel Green
- Pam Kilmartin
- Syuichi Nakano
- Ryan S. Park. (Rotating Member)
- Driss Takir (Rotating Member)
- Jin Zhu
- Willy Benz, *ex-officio* (IAU President)
- Diana Mary Worrall, *ex-officio* (IAU General Secretary)
- Rita Schulz, *ex-officio* (WGPSN)
- Peter Vereš, *ex-officio* (MPC)

The WGSBN is a functional Working Group of the IAU, under the Executive Committee.



