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Challenges in reconciling observations and theory of the brightest gamma-ray flare ever of 3C 279

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Blazars radiate from radio through gamma-ray frequencies and thereby make ideal targets for multifrequency studies. Such studies allow the properties of the emitting jet to be constrained. 3C 279 is among the most notable blazars and therefore subject to extensive multifrequency campaigns. We report the results of a campaign ranging from near-IR to gamma-ray energies that targeted an outburst of 3C 279 in 2015 June. The campaign pivots around the detection in only 50 ks by INTEGRAL, whose IBIS/ISGRI data pin down the high-energy component of the spectral energy distribution (SED) between Swift-XRT data and Fermi-LAT data. The overall SED from near-IR to gamma rays can be well represented by either a leptonic or a lepto-hadronic radiation transfer model. Even though the data are equally well represented by the two models, their inferred parameters challenge the physical conditions in the jet. In fact, the leptonic model requires parameters with a magnetic field far below equipartition with the relativistic particle energy density. In contrast, equipartition may be achieved with the lepto-hadronic model, although this implies an extreme total jet power close to the Eddington luminosity.

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