Proton therapy centres in Norway

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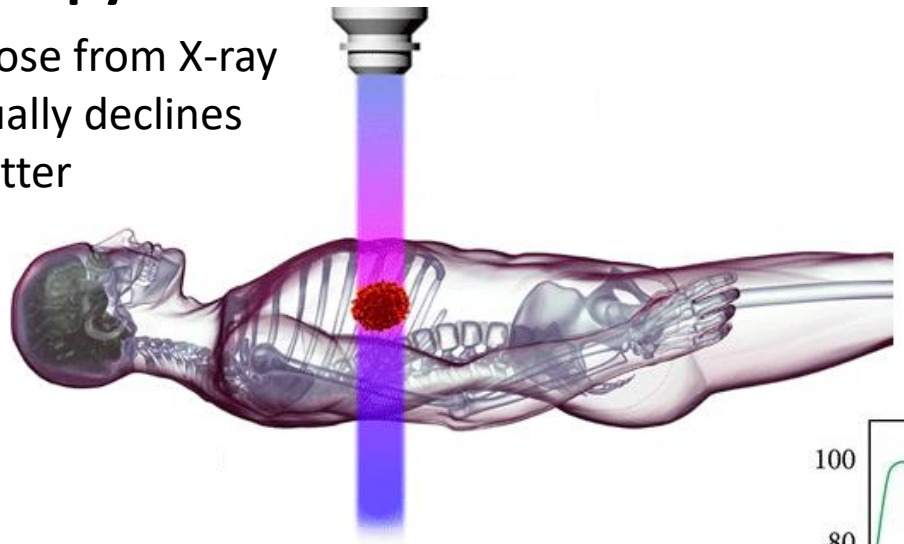
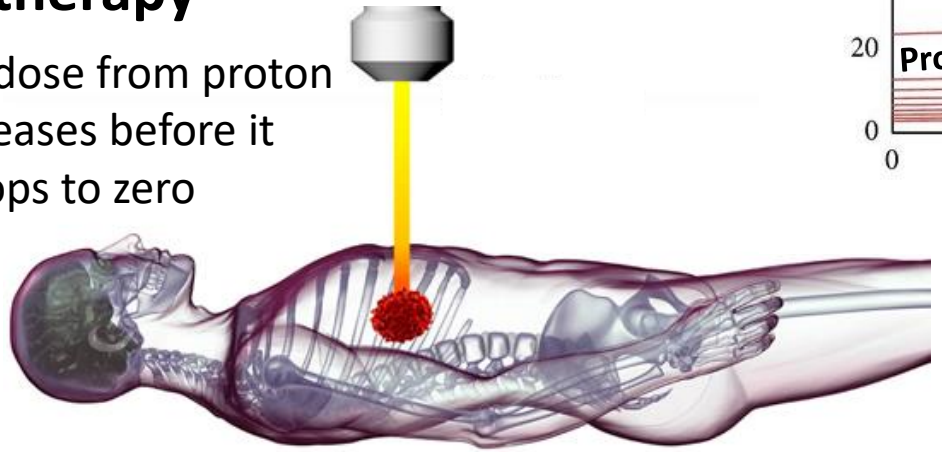
X-ray therapy

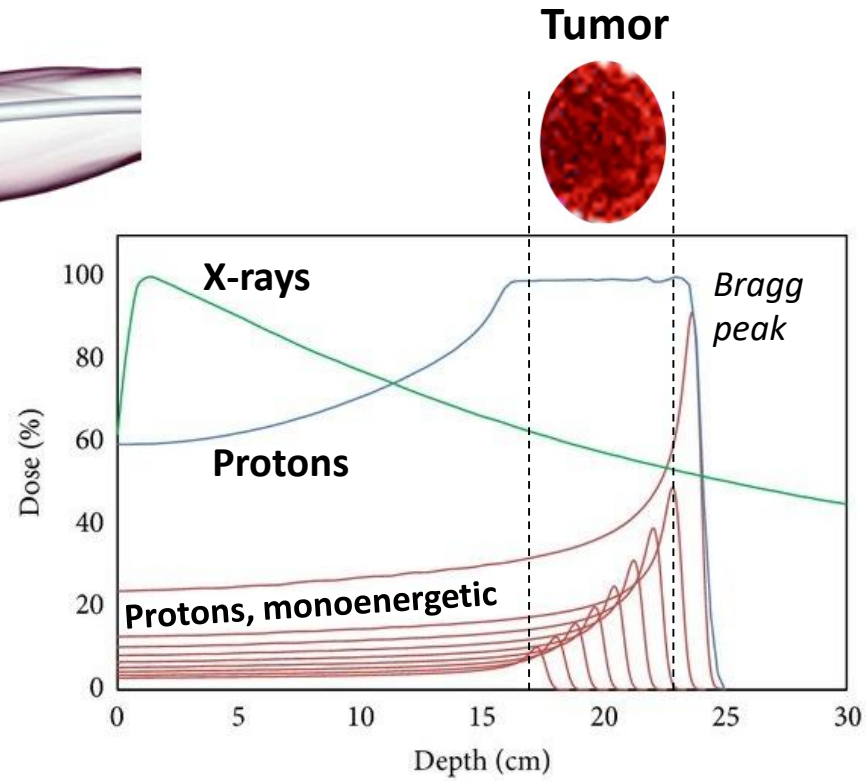
Radiation dose from X-ray beam gradually declines through matter



Proton therapy

Radiation dose from proton beam increases before it rapidly drops to zero





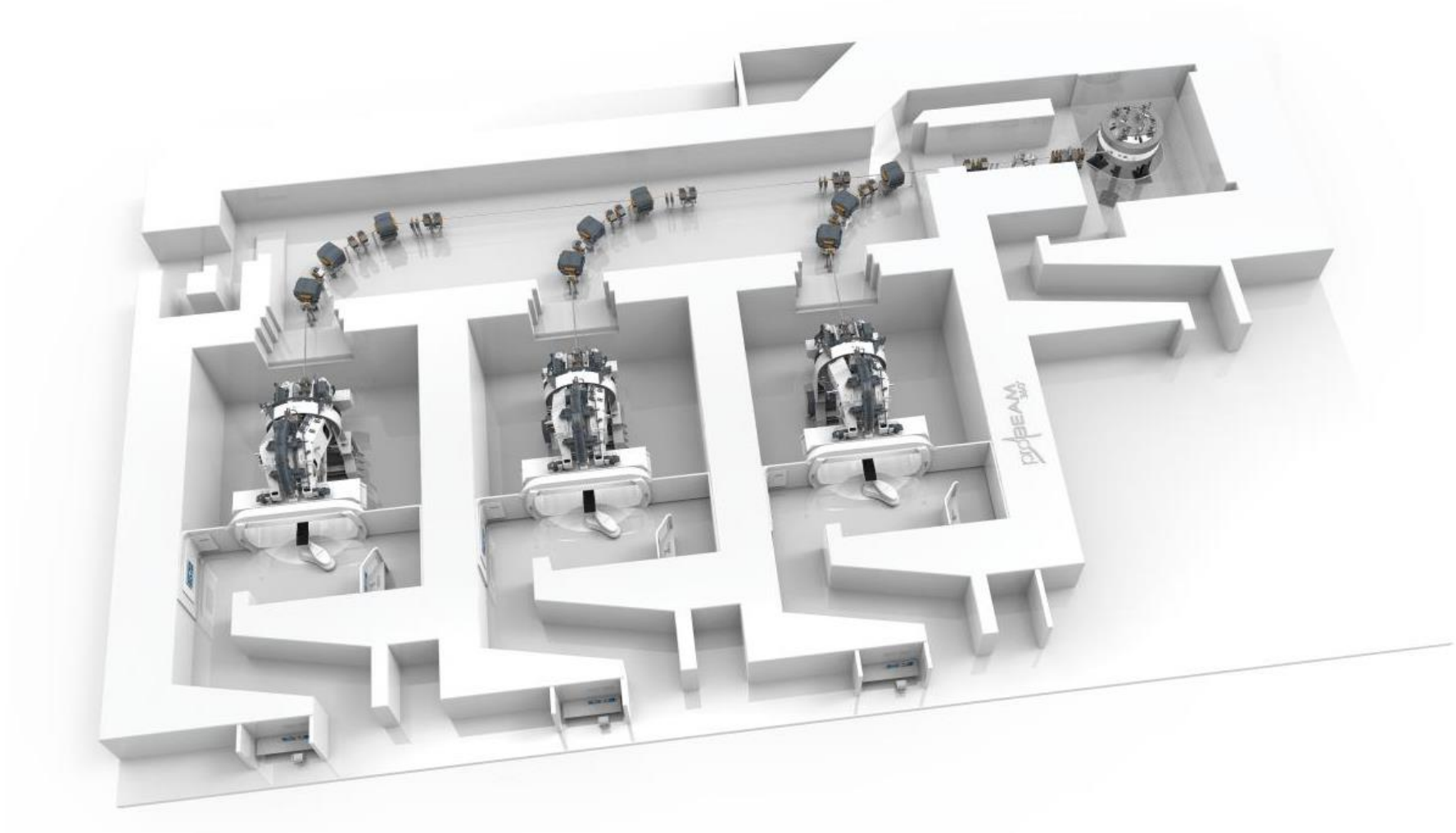
Protons vs X-rays

Proton Beam Therapy - Mayo Clinic

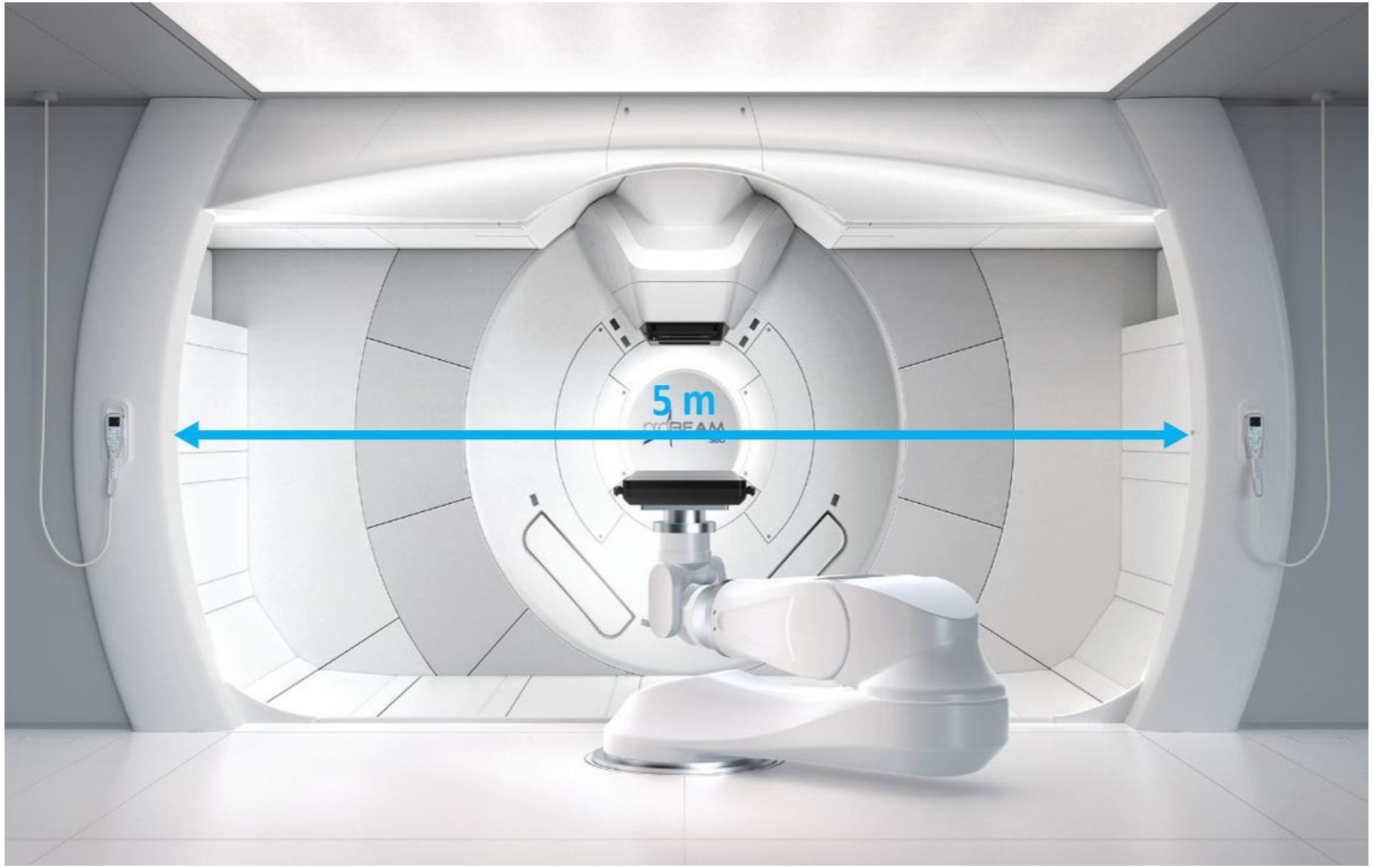
New Radium hospital - 2024

Proton center at Haukeland

Varian ProBeam360



Treatment room and gantry



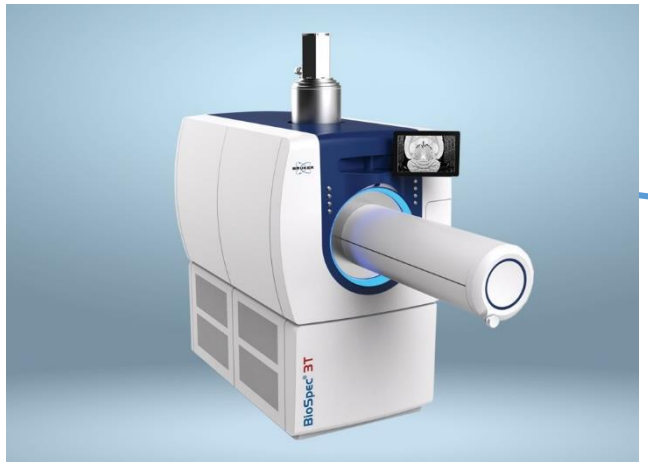
Coming infrastructure, Oslo

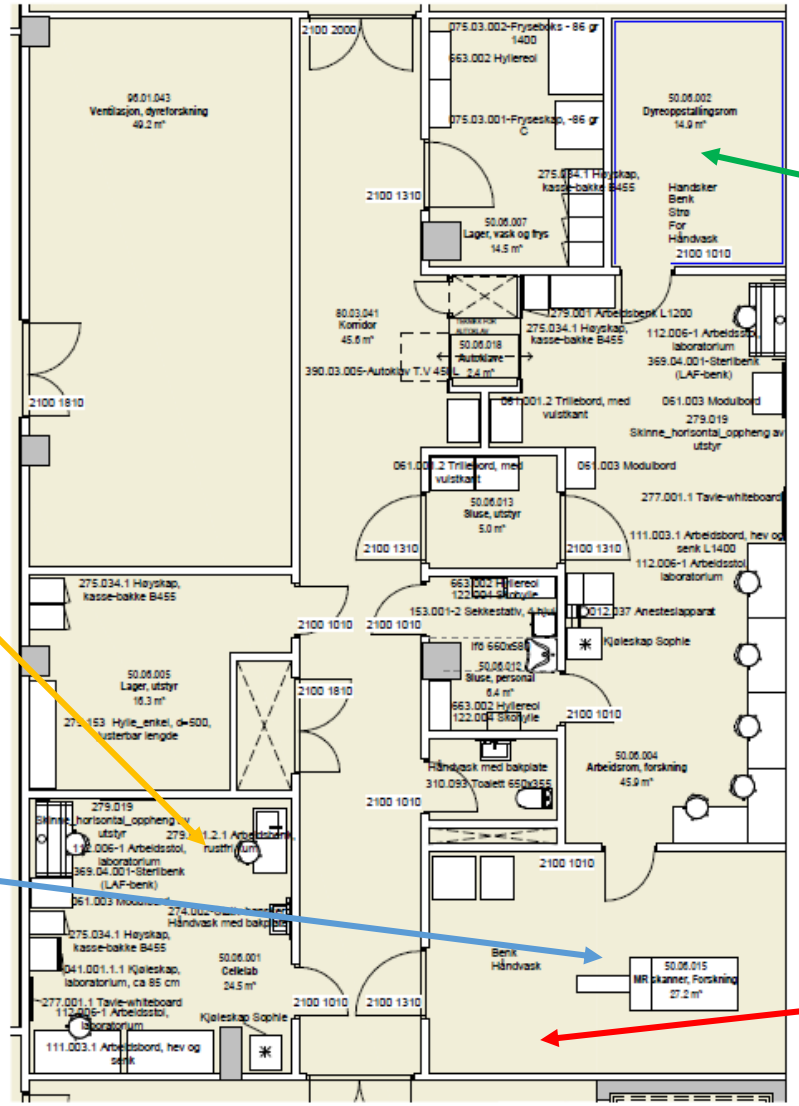
Ground floor (U1)

Research gantry

Office space for researchers on 2nd floor

Lower ground floor (U2)

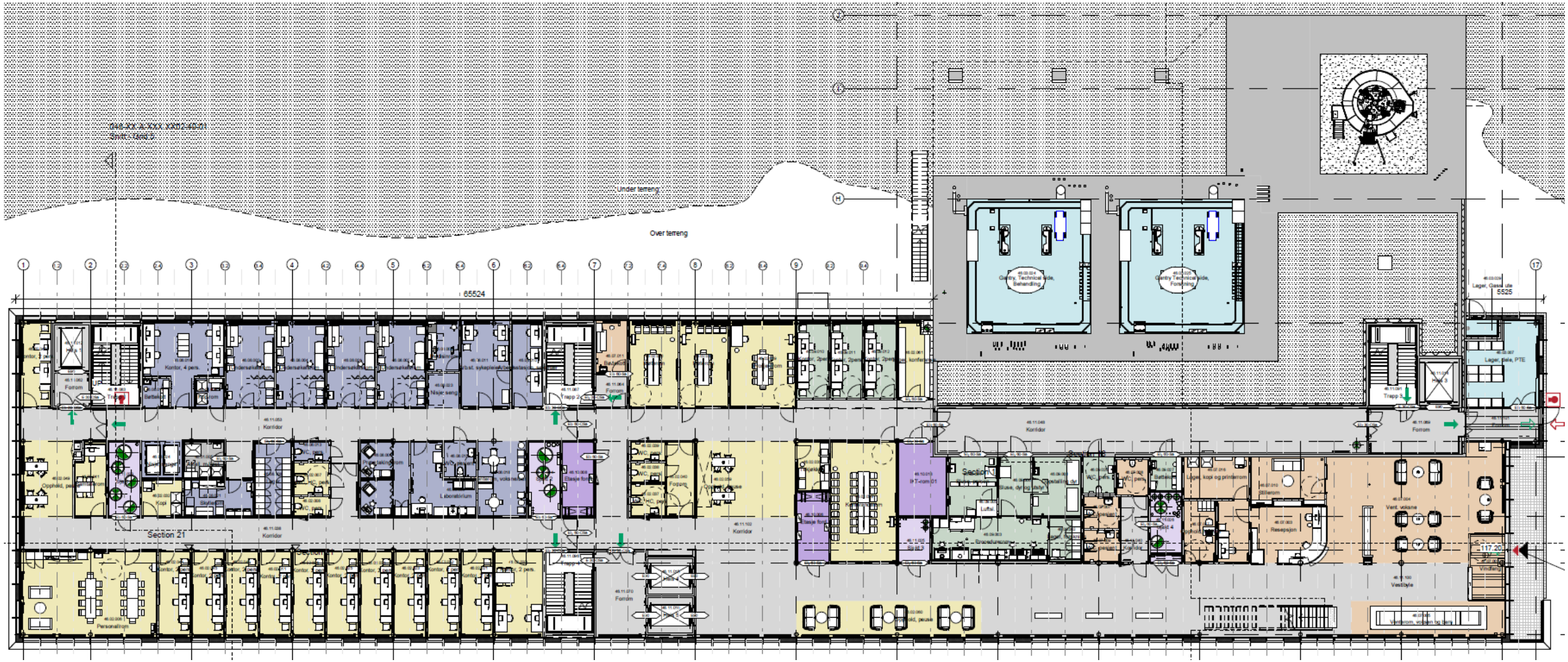




?

Coming infrastructure, Bergen

1st floor
Green: research areas



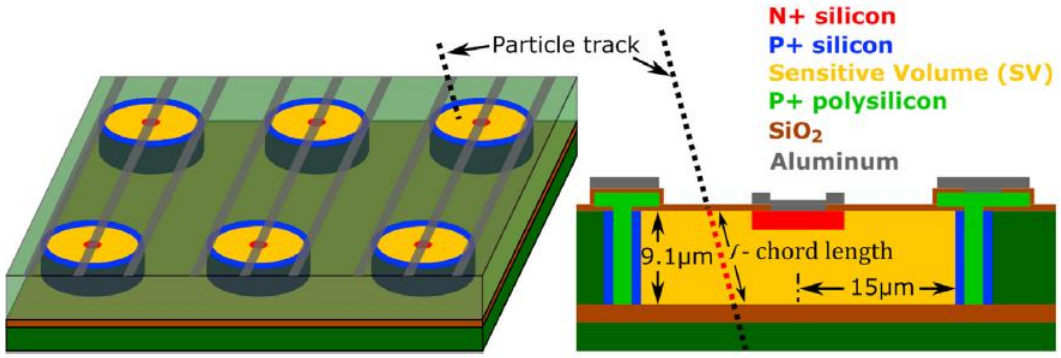
Plan, Oslo

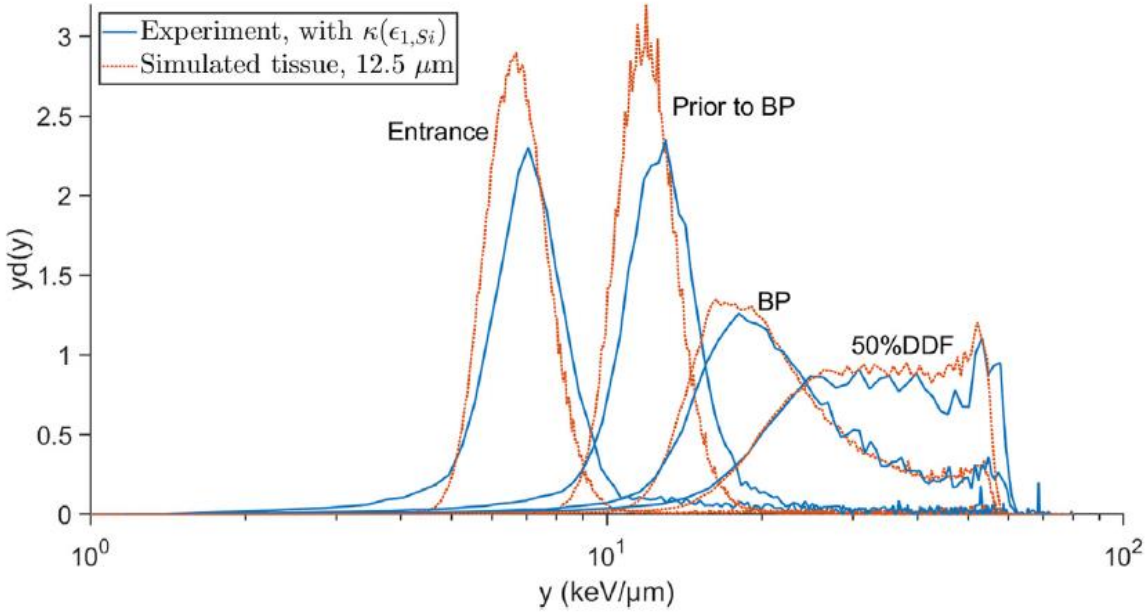
(Confidential, do not share)

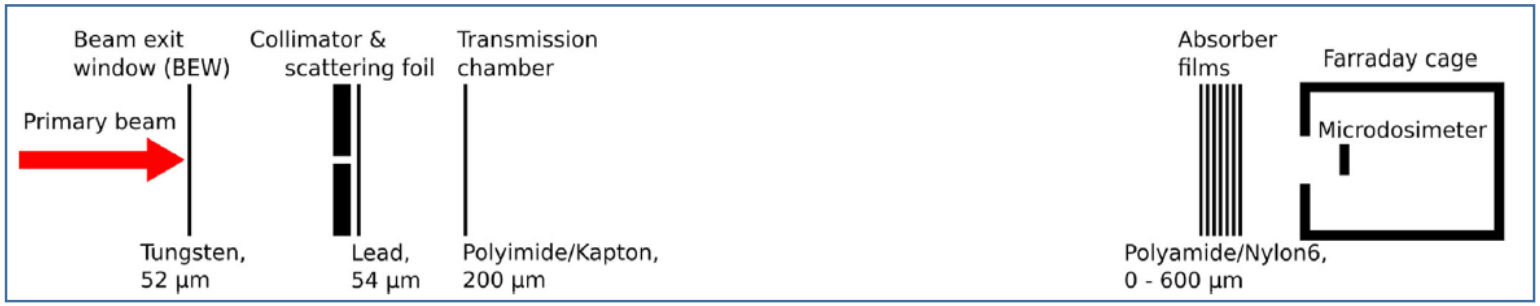
Organization of coming infrastructure

- The pre-clinical infrastructure in Oslo will be organized as a *core facility*
- Access to all Norwegian and international research groups
- Most likely similar arrangement in Bergen
- In case of high demand, a national board must prioritize

Microdosimetry with a 3D silicon on insulator

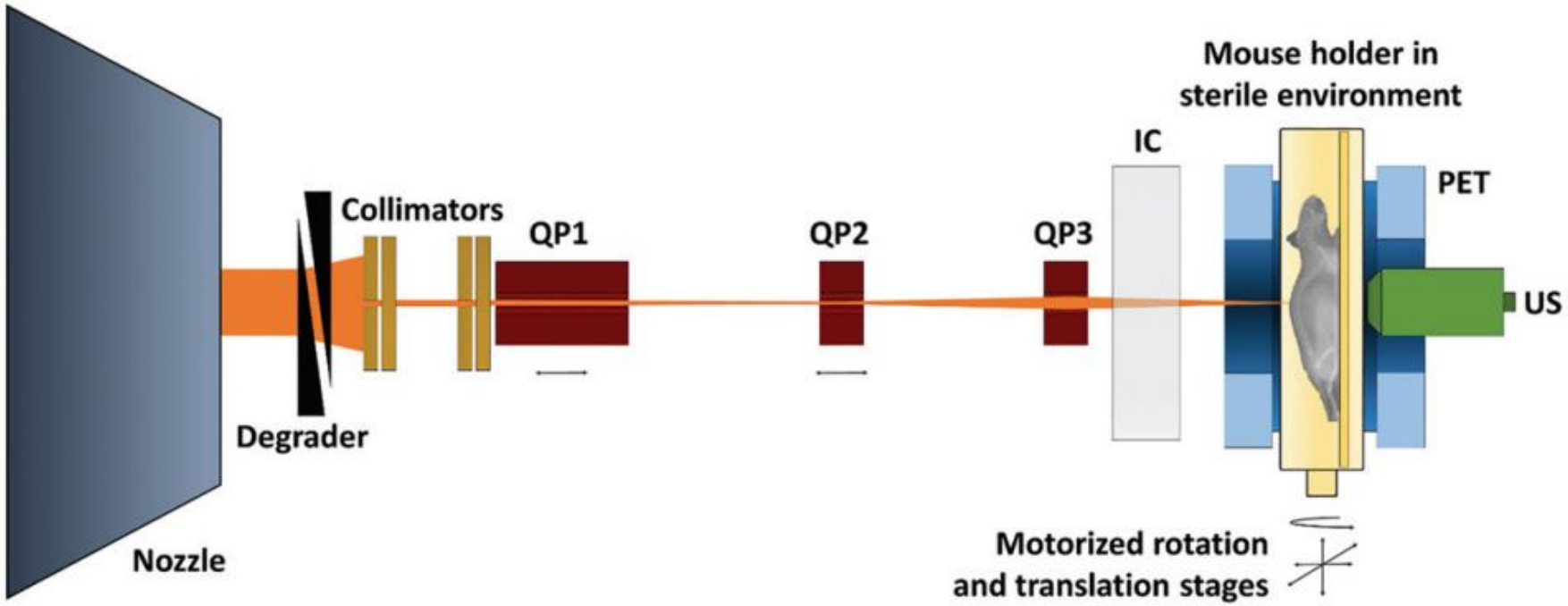






Radiation Physics and Chemistry 176 (2020) 109078

Small animal platform

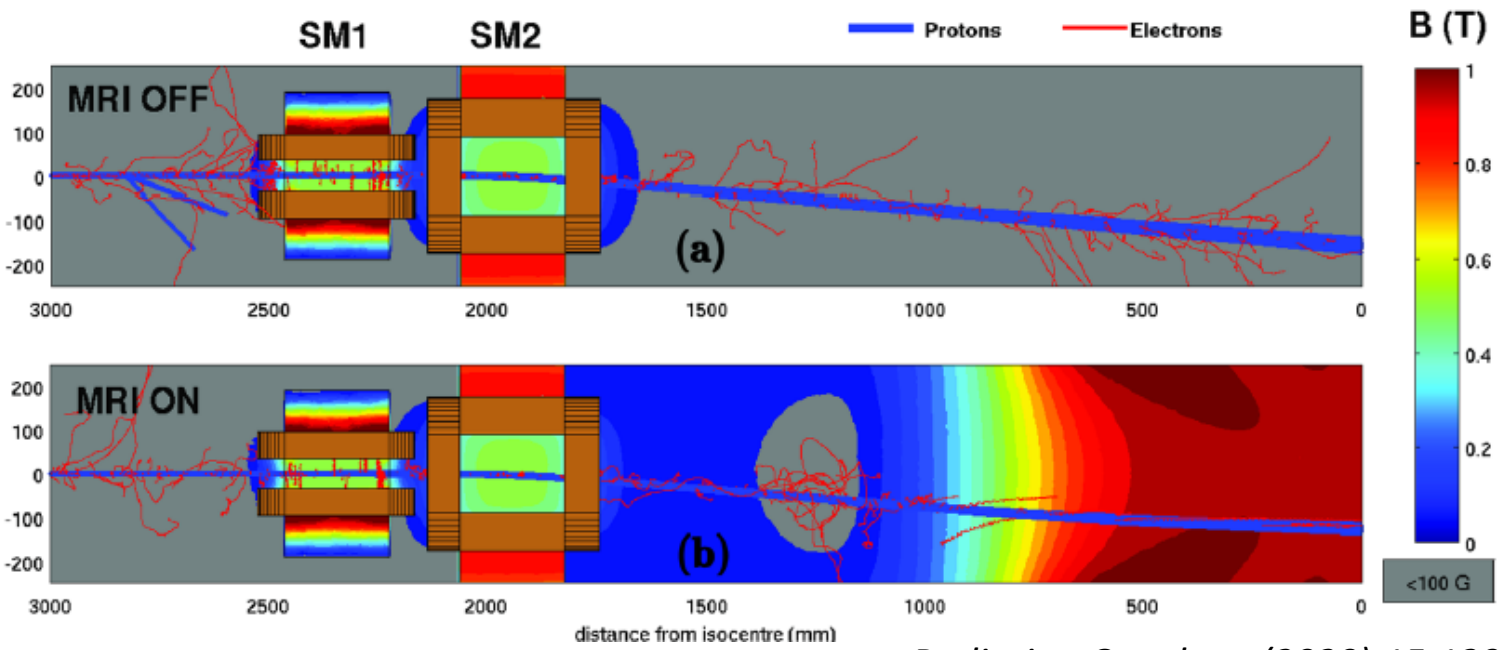


Precise dose application with in situ multi-modal anatomical image guidance and in vivo verification of the actual treatment delivery

ACTA ONCOL 2019, 58, 1470–1475

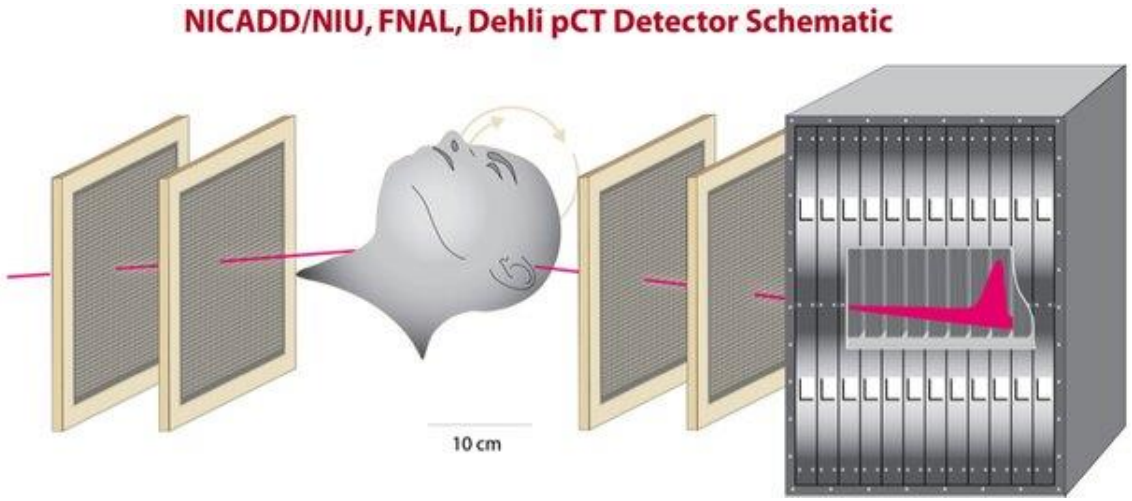
MR-guided proton therapy

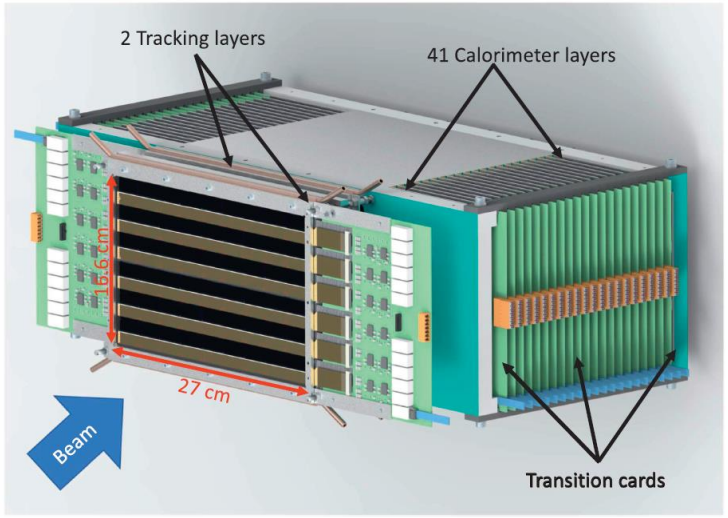
- MRI: superior soft tissue contrast
- Use MRI to guide proton delivery to the tumor
- Technological challenges
- Next 5-10 years?



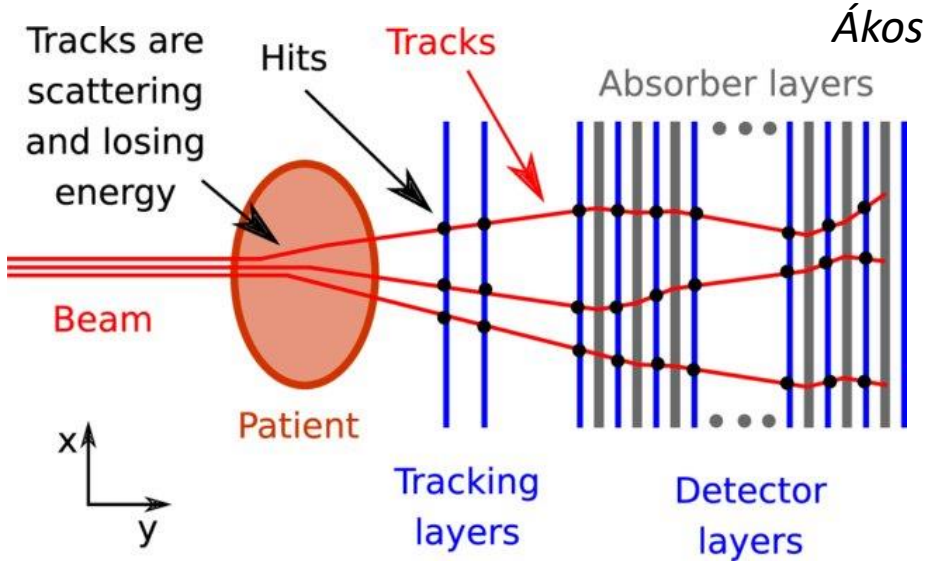
Radiation Oncology (2020) 15:129

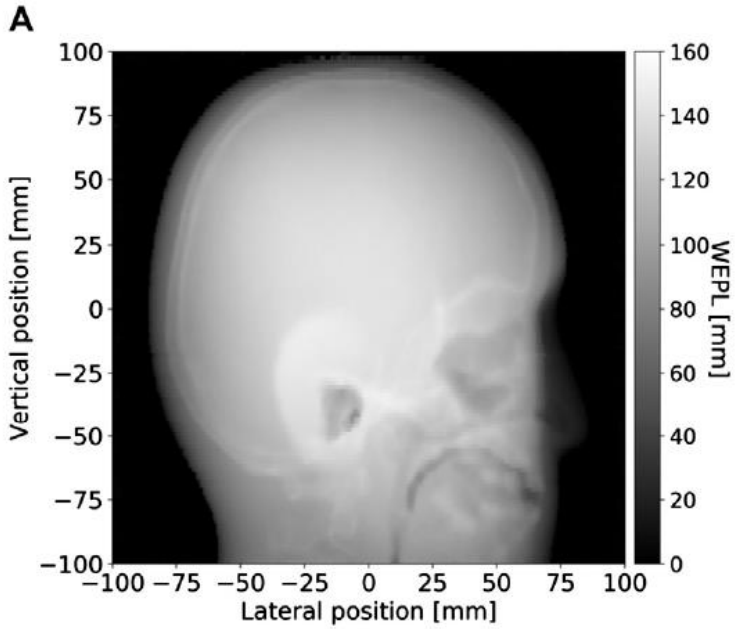
Proton computed tomography





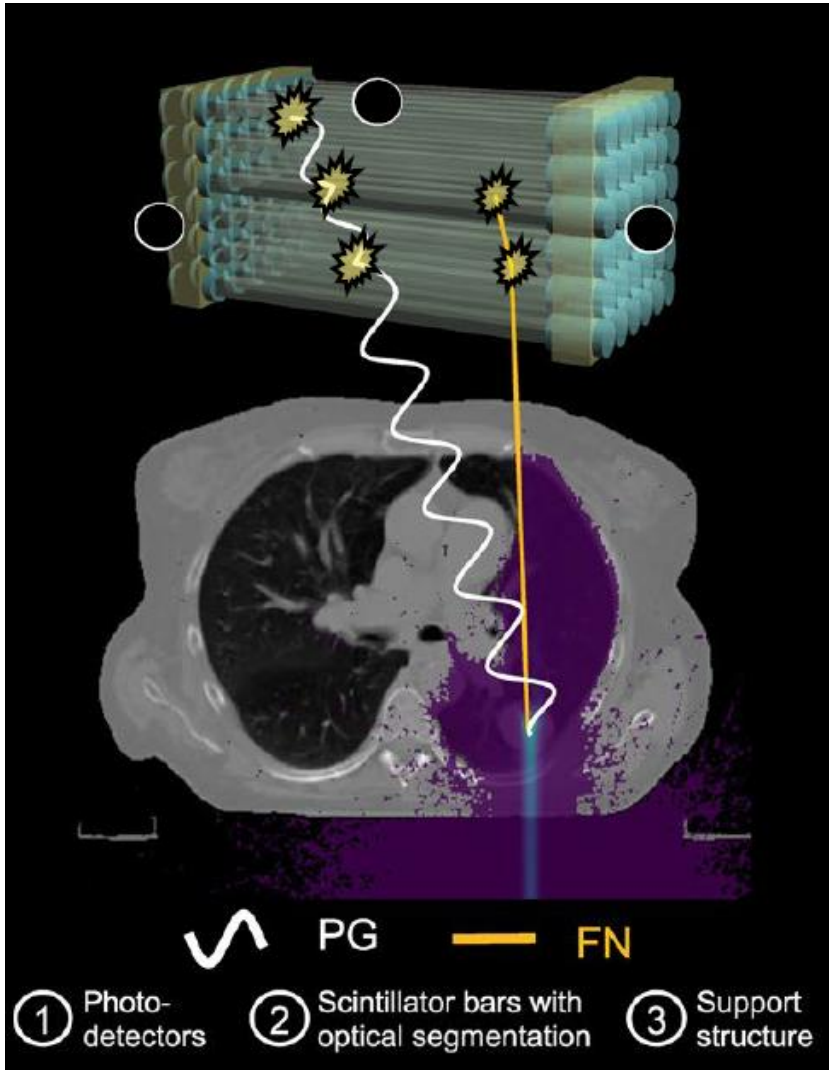
Ákos Sudár

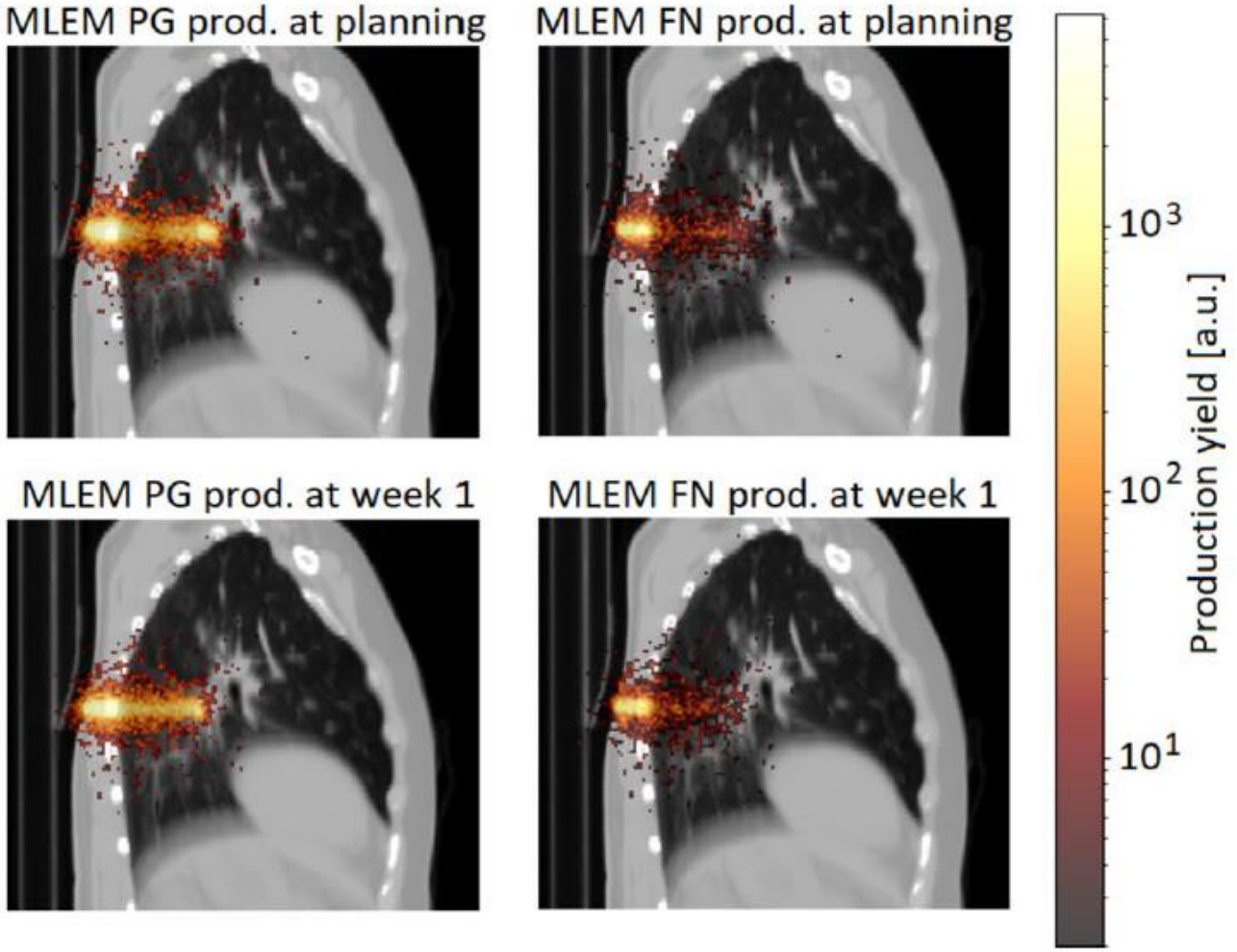




Journal of Instrumentation 11 (2015) Front. Phys. 8:568243 (2020)

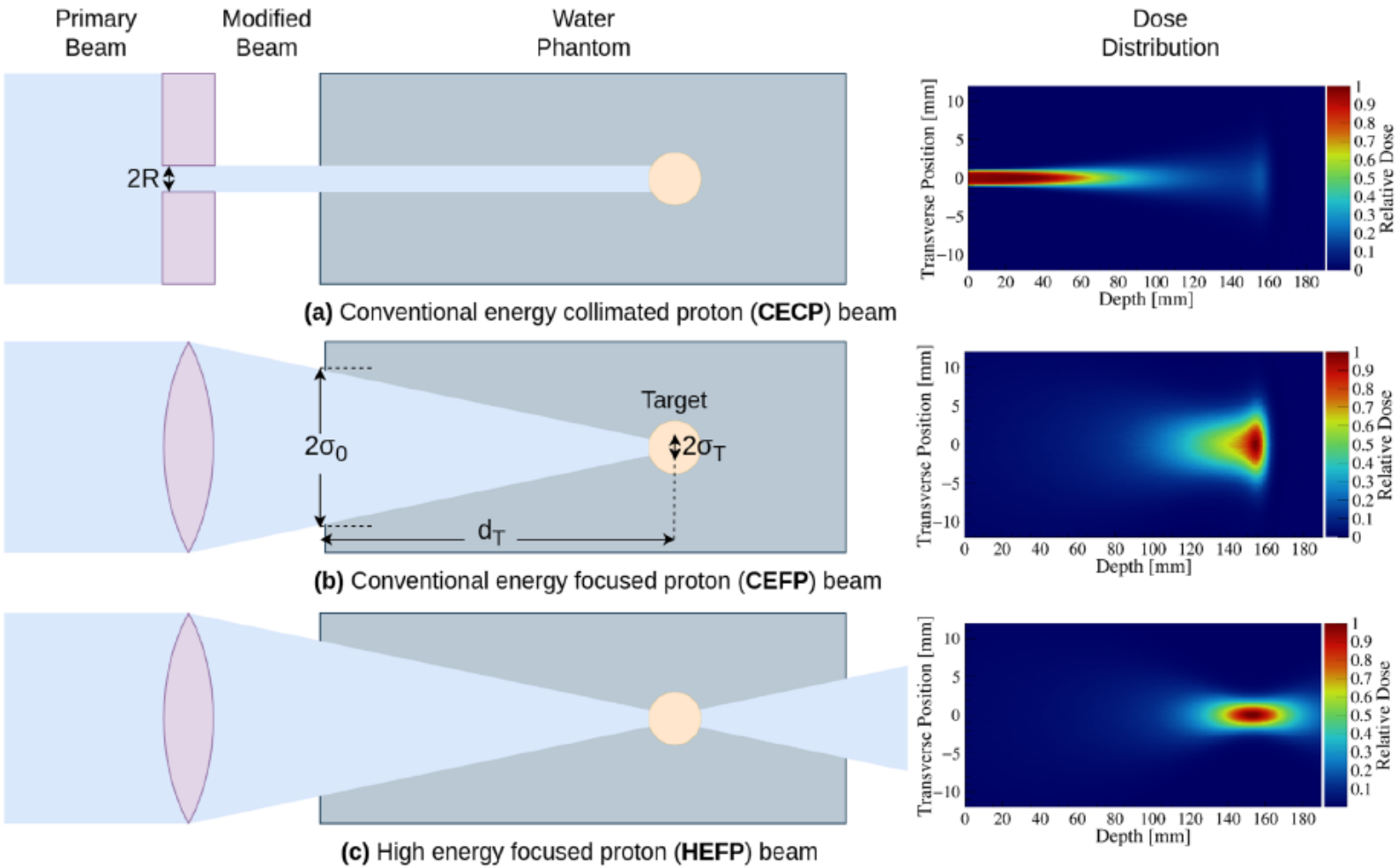
NOVO: Hybrid approach to treatment verification





Scientific Reports | (2023) 13:6709

Sharp dose profiles for high precision proton therapy



Scientific reports 2022

Research opportunities in proton therapy*

- Clinical trials
- Translational research
- New delivery principles
- Technological innovations
- AI in proton therapy

*Report in Norwegian

19.05.2022. Rapportskrivingen er koordinert av Eirik Malinen (UiO/OUS) og Åse Bratland (OUS) for Nasjonalt virksomhetsprosjekt - flerregional behandlingstjeneste innen protonterapi, med bidrag fra Thomas Kilvær (UNN/UiT), Kathrine Røe Redalen (NTNU), Signe Danielsen (St Olav/NTNU), Kristian Smeland Ytre-Hauge (UiB), Sara Pilskog (HUS/UiB), Liv Bolstad Hysing (HUS/UiB), Einar Dale (OUS), Taran Paulsen Hellebust (OUS/UiO), Marianne Grønlie Guren (OUS/UiO), Petter Brandal (OUS), Randi Syljuåsen (OUS), Heidi Lyng (OUS/UiO) og Nina Edin (UiO).

Costs…