

Electron and ion acceleration news from the novel Petawatt laser facility in Dresden

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Applications of laser plasma accelerated particle beams ranging from the driving of light sources to radiation therapy require controlled scaling of particle beam energy and charge as well as reproducible operating conditions. Both issues have motivated the development of novel table-top class Petawatt laser systems (e.g., 30J pulse energy in 30fs) with unprecedented pulse control, here represented by the dual beam Draco-PW system recently commissioned at HZDR Dresden.

First results will be presented on laser wakefield electron acceleration where in the beam loading regime high bunch charges in the nC range could be efficiently accelerated with good beam quality, and on PW class proton acceleration scaling. Several methods relying on target tailoring will be summarized to reliably provide about 10 MeV cut-off energy per Joule of laser energy up to the range of 25 MeV ready for applications. Here, pulsed magnet beam transport ensures depth dose distributions allowing for tumor irradiation in dedicated animal models.