

Laser-Driven Ion Acceleration: Review of Mechanisms, State of the Art and Applications

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Ion acceleration driven by high intensity laser pulses is attracting an impressive and steadily increasing research effort. Experiments over the past 10-15 years have demonstrated, over a wide range of laser and target parameters, the generation of multi-MeV proton and ion beams with unique properties such as burst emission, high brilliance, and low emittance. The talk will provide an overview of the state of the art of ion acceleration by discussing both the established sheath acceleration mechanism (or TNSA), and emerging mechanisms (Radiation Pressure Acceleration, Break Out Afterburner), which hold the promise for acceleration to GeV/nucleon energies with next generation laser facilities. Proposed, and already implemented, applications of these beams will also be discussed.

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