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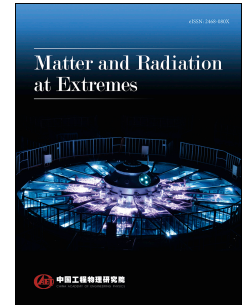
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Abstract

Research activities in Japan relevant to particle beam inertial fusion are briefly reviewed. These activities can be ascended to the 1980s. During the past three decades, significant progress in particle beam fusion, pulsed power systems, accelerator schemes for intense beams, target physics, and high-energy-density physics research has been made by a number of research groups at universities and accelerator facilities in Japan. High-flux ions have been extracted from laser ablation plasmas. Controllability of the ion velocity distribution in the plasma by an axial magnetic and/or electric field has realized a stable high-flux low-emittance beam injector. Beam dynamics have been studied both theoretically and experimentally. The efforts have been concentrated on the beam behavior during the final compression stage of intense beam accelerators. A novel accelerator scheme based on a repetitive induction modulator has been proposed as a cost-effective particle-beam driver scheme. Beam-plasma interaction and pulse-powered plasma experiments have been investigated as relevant studies of particle beam inertial fusion. An irradiation method to mitigate the instability in imploding target has been proposed using oscillating heavy-ion beams. The new irradiation method has reopened the exploration of direct drive scheme of particle beam fusion.

1. Introduction

The concept of particle beam fusion began with a scheme driven by relativistic electron beams in the 1970s [1]. Although a system design of heavy-ion fusion (HIF) was proposed in 1979 [2], Japanese research activity into particle beam fusion started in earnest in the 1980s using a scheme based on a driver composed of intense light-ion beams (LIBs). There is not a coherent research program in Japan, but a number of research groups at the Tokyo Institute of Technology (TIT), Utsunomiya University (UU), Nagaoka University of Technology (NUT), Osaka University (OU), and the High Energy Accelerator Research Organization (KEK) have advanced studies in fields relevant to particle beam fusion. These research groups have also collaborated with research groups at Lawrence Berkeley National Laboratory

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