Amplification of a Laser Beam for the Fast Ignition of a Thermonuclear Target

Friedwardt Winterberg

University of Nevada, Reno, Nevada, 1664 N. Virginia St. MS 220, Reno, NV 89523, USA

Reprint requests to Prof. F. W.; Fax: (775) 784-1398; E-mail winterbe@physics.unr.edu


It is proposed to simultaneously compress a thermonuclear target and amplify a laser beam by a single $z$-pinch discharge. The laser beam is imploded and amplified by a cylindrical convergent shock wave inside a capillary, transforming it into a soft X-ray pulse for the fast ignition of the thermonuclear target. The target is compressed inside a liner by the $z$-pinch current. The capillary is attached to one end of the cylindrical target, and is protected by a radial wire spoke array fast opening switch against its premature implosion by the convergent shock wave. The $z$-pinch can be stabilized by placing it into a powerful vortex.

Key words: Fast Ignition; $z$-Pinch; Laser Amplification.