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Fast-Shock Ignition: A New Concept to Inertial Confinement Fusion SEYED ABOLFAZL GHASEMI, AMIR HOSSEIN FARAHBOD, Research Center of Laser and Optics, LASER PLASMA INTERACTION TEAM — A new concept for inertial confinement fusion called fast-shock ignition (FSI) is introduced to obtain high target gain. In the proposed model, the separation of fuel ignition into two successive steps, under the suitable conditions, reduces required ignitor energy. The main procedure in FSI concept is at first, compressing the fuel up to stagnation. Then, two high intensity short pulse laser spikes with energy and power lower than those required for shock ignition (SI) and fast ignition (FI) with a proper delay time launched at the fuel which increases the central hot-spot temperature and complete the ignition of the pre compressed fuel. The introduced semi-analytical model indicates that with fast-shock ignition, the total required energy for compression and ignition of the fuel can be slightly reduced in comparison with pure shock ignition. Furthermore, for fuel mass greater than 2mg, the target energy gain increases up to 15 percent and the contribution of fast ignitor could be decreased about 20 percent over pure fast ignition. The FSI scheme is beneficial from technological considerations for the construction of short pulse high power laser drivers. The general advantages of fast-shock ignition over pure shock ignition can be better than 1.3.

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