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Experimental investigation of the interaction between a short high-intensity laser pulse and a long and hot plasma CLEMENT GOYON, CEA, DAM, DIF, F-91297 Arpajon, France, SYLVIE DEPIERREUX, CEA, DAM, DIF, CLAIRE BACCOU, LULI, CLÉMENT COURVOISIER, CEA,DAM,DIF, GUILLAUME LOISEL, VINCENT YAHIA, LULI, NATALIA BORISENKO, P. N. Lebedev Physical Institute, PAUL-EDOUARD MASSON-LABORDE, CEA, DAM, DIF, ANDREI OREKHOV, P. N. Lebedev Physical Institute, OLGA ROSMEJ, GSI, VLADIMIR TIKHONCHUK, CELIA, CHRISTINE LABAUNE, LULI
— Shock ignition (SI) is a two steps alternative direct-drive scheme for inertial fusion. The first one is a several nanoseconds long compression with low intensity beams. The second one is a several hundred of picoseconds stage using high intensity beams to create a converging shock leading to ignition. The coupling of this intense pulse with the coronal plasma is the most unknown of this scheme. We have designed an experiment that couples a high intensity laser pulse (526nm 20J 1-12 ps) and a high-energy laser pulse (526nm 400J 1.5 ns). We are able to study the interaction in the intensity range from 1015 up to 3.1016 W/cm2 relevant to the interaction of the SI spike in preformed, hot (1 keV) and long (mm scale) plasmas. The picosecond beam was used with a random phase plate as the interaction pulse. We present the first measurements of time-resolved backscattered spectra from the smoothed picosecond beam as well as the transmitted intensity distribution through the plasma. We find that Brillouin instability can be responsible for up to 60% reflectivity in plasmas while Raman reflectivity stays at low levels.

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