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Laser-plasma interaction physics on the LIL facility PAUL-EDOUARD MASSON-LABORDE, P. LOISEAU, M. CASANOVA, D. TEYCHENNE, CEA, DAM, DIF, S. HULLER, D. PESME, J. ROBICHE, CPHT, Ecole Polytechnique, C. LABAUNE, LULI, Ecole Polytechnique, S. DEPIERREUX, D.T. MICHEL, CEA, DAM, DIF, V. TIKHONCHUCK, CELIA, Bordeaux, P. NICOLAI, CELIA, Universite Bordeaux — Experiments have been carried out on the LIL (Ligne d'Integration Laser) facility with foam targets in order to study interaction physics in underdense plasma, in the millimeter scale at temperature around 2 keV. The LIL facility, which is a prototype of one quadruplet of the near coming French laser Megajoule (LMJ), has been used to deliver 2.7ns pulse with 12kJ at 3w. Low-density foams (3 to 10 mg/cc) with varying lengths have been used in these experiments in order to understand the physics of parametric instabilities, mainly stimulated Brillouin (SBS) and Raman scattering (SRS) and filamentation. We will present and discuss hydrodynamics simulations carried out with the code FCI2, giving us all the plasma parameters: electron density, velocity and temperature profiles. All these plasma conditions can be used to estimate SBS and SRS linear gain with the postprocessor Piranah and to make comparisons between calculated and experimental spectra. Results will then be presented on the beam propagation through the foam and on the evolution of SBS using our paraxial codes HERA and Harmony.

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