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5P09 - TECHNICAL DEVELOPMENT AND FIRST RESULTS OF ISENTROPIC COMPRESSION EXPERIMENTS ON THE ICE-16 TEST FACILITY

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High current drivers are key tools for material-physics experiments. For this study, the range of interest is to reach 0.1 to 3 GPa magnetic pressure in a sample area of several tens of square centimeters. An accurate control of the pressure wave is needed: 1D propagation, pressure homogeneity on sample area, reproducibility of pressure between experiments, modularity of pressure amplitude between experiments, etc. For this range of pressure, this accurate control of shockless compression doesn't need a pulse tailoring capability and can be reached with a several hundred ns rise time.

Such isentropic compression experiments are done at CEA on GEPI driver since 2002. GEPI can deliver a 3.5 MA –500 ns pulse to a low inductance (< 1 nH) strip line load, for load widths less or equal to 70 mm. An upgrade, named GEPI-2, is under development with the goal to deliver a 6 MA –1 microsecond pulse to a higher inductance (several nH) load, for load widths reaching 140 mm. ICE-16 is a test facility used to develop diagnostics, demonstrate enhanced performances and optimize different capacities of interest for GEPI-2: capacitors and switches with high reliability and high performance/cost ratio, strip line or curved loads with up to 130 square centimeters sample area, vacuum switch crowbar to control the ringing shape of the current pulse delivered to the load. Design, circuit or EM simulations and first results of isentropic compression experiments on ICE-16 are presented.

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