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Ramp compression of a metallic liner driven by a shaped 5 MA current on the SPHINX machine THIERRY D'ALMEIDA, FRANCIS LASSALLE, ALAIN MORELL, JULIEN GRUNENWALD, FRÉDÉRIC ZUCCHINI, ARNAUD LOYEN, CEA, THOMAS MAYSONNAVE, ITHPP, ALEXANDRE CHUVATIN, Ecole Polytechnique — SPHINX is a 6MA, 1-μs Linear Transformer Driver operated by the CEA Gramat (France) and primarily used for imploding Z-pinch loads for radiation effects studies. Among the options that are currently being considered for improving the generator performances, there is a compact Dynamic Load Current Amplifier (DLCM). A method for performing magnetic ramp compression experiments, without modifying the generator operation scheme, was developed using the DLCM to shape the initial current pulse. We present the overall experimental configuration chosen for these experiments, based on electrical and hydrodynamic simulations. Initial results obtained over a set of experiments on an aluminum cylindrical liner, ramp-compressed to a peak pressure of 23 GPa, are presented. Details of the electrical and Photonic Doppler Velocimetry (PDV) setups used to monitor and diagnose the ramp compression experiments are provided. Current profiles measured at various locations across the system, particularly the load current, agree with simulated current profile and demonstrate adequate pulse shaping by the DLCM. The liner inner free surface velocity measurements agree with the hydrocode results obtained using the measured load current as the input. Higher ramp pressure levels are foreseen in future experiments with an improved DLCM system.

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