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The generation of warm dense matter samples using pulsed-power generators[1] P.-A. GOURDAIN, C. E. SEYLER, University of Rochester, P. F. KNAPP, Sandia National Laboratories — Warm dense matter (WDM) bridges the gap between plasma and condensed matter, with densities similar to that of a solid, but temperature on the order of 1 eV. WDM is key to understanding the formation of gaseous giants, Mega-Earths, planetary collisions and inertial fusion implosions. Yet, the quantum properties of WDM and how they are expressed at the macroscopic level are mostly unknown. This paper uses 3-dimensional numerical simulations to show that cm-scale WDM samples can be generated by pulsed-power machines using a *fast* plasma closing switch, which virtually eliminates the mixing of WDM with other states of matter, allowing the measurement of its physical properties using line average diagnostics. A pre-ionized gas puff is imploded onto a central metal rod. Initially, most of the discharge current flows inside the gas shell. When the shell reaches the rod the full current switches to the rod in less than 10 ns. The subsequent compression produces WDM. We will discuss how an existing platform to generate cm-scale WDM at 20MA on the Z-machine at Sandia National Laboratories.

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