

Abstract Submitted  
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**Neutron Signatures of Non-Thermal Ion Distributions in Z-Pinch Driven ICF Plasmas**<sup>1</sup> PATRICK KNAPP, CHRISTOPHER JENNINGS, DANIEL SINARS, Sandia National Laboratories — In preparation for upcoming ICF experiments on the 26 MA Z machine (e.g., D2 gas puff, MagLIF [1]), we are studying the neutron energy spectra produced by magnetically-driven loads beyond the archetypal single temperature, uniform plasma. Z-pinch sources frequently exhibit evidence of unusual neutron spectra [2], which can be attributed to three-dimensional turbulent motion, high-energy beams, and other phenomena leading to non-Maxwellian ion distributions. Understanding the nature of our plasma neutron sources is critical for understanding how they scale with increasing current. We will show Monte Carlo and analytic calculations for plausible scenarios and discuss the corresponding signatures for the existing set of time-of-flight diagnostics on Z.

[1] S. A. Slutz et al. Phys. Plasmas 17, 056303 (2010)

[2] V.V. Vikhrev and V.D. Korolev, Plasma Dynamics, Vol. 33, No. 5 (2007)

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Patrick Knapp  
Sandia National Laboratories

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