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Controlling Rayleigh-Taylor instabilities in solid liner implosions with rotating magnetic fields[1] P. F. SCHMIT, R. D. MCBRIDE, G. K. ROBERTSON, Sandia National Laboratories, A. L. VELIKOVICH, Naval Research Laboratory — We report calculations demonstrating that a remarkable reduction in the growth of the magneto-Rayleigh-Taylor instability (MRTI) in initially solid, cylindrical metal shells can be achieved by applying a magnetic drive with a tilted, dynamic polarization, forming a solid-liner dynamic screw pinch (SLDSP). Using a self-consistent analytic framework [A. L. Velikovich and P. F. Schmit, PoP 22, 122711 (2015)], we demonstrate that MRTI growth factors of the most detrimental modes may be reduced by up to two orders of magnitude relative to conventional z-pinch implosions. One key application of this technique is to enable increasingly stable, higher performance liner implosions to achieve fusion [M. R. Gomez et al., PRL 113, 155003 (2014)]. We weigh the potentially dramatic benefits of the SLDSP against the practical tradeoffs required to achieve the desired drive field history and identify promising target designs for future experimental and computational investigations.

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Paul Schmit
Sandia National Laboratories

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