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The Fusion Gain Analysis of the Inductively Driven Liner Compression Based Fusion AKIHISA SHIMAZU, JOHN SLOUGH, University of Washington — An analytical analysis of the fusion gain expected in the inductively driven liner compression (IDLC) based fusion is conducted to identify the fusion gain scaling at various operating conditions. The fusion based on the IDLC is a magneto-inertial fusion concept, where a Field-Reversed Configuration (FRC) plasmoid is compressed via the inductively-driven metal liner to drive the FRC to fusion conditions. In the past, an approximate scaling law for the expected fusion gain for the IDLC based fusion was obtained under the key assumptions of (1) D-T fuel at 5-40 keV, (2) adiabatic scaling laws for the FRC dynamics, (3) FRC energy dominated by the pressure balance with the edge magnetic field at the peak compression, and (4) the liner dwell time being liner final diameter divided by the peak liner velocity. In this study, various assumptions made in the previous derivation is relaxed to study the change in the fusion gain scaling from the previous result of $G \propto m_l^{1/2} E_l^{11/8}$, where m_l is the liner mass and E_l is the peak liner kinetic energy. The implication from the modified fusion gain scaling on the performance of the IDLC fusion reactor system is also explored.

Akihisa Shimazu
University of Washington

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