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Analytic models for pulsed x-ray impulse coupling[1] R.J. LAWRENCE, M.D. FURNISH, SNL, J.L. REMO, Harvard U. — Pulsed x-ray momentum coupling is a promising technology for early deflection of NEOs (Near Earth Objects) that might impact Earth. Analytic models for the interactions can preclude the need for large hydrocodes, and provide many point calculations that reveal important features of the nonlinear phenomena, e.g., thresholds and peak coupling. However, validation is an important element. One such model is used to analyze experiments conducted on the Sandia Z machine. Relevant samples were exposed to 5-ns x-ray pulses of a ∼200-eV blackbody at ∼1 kJ/cm^2. Target momenta were measured. Model calculations give impulse couplings somewhat greater than the data. Possible reasons include inherent target heterogeneities, and uncertain target decomposition energies. The work suggests that extrapolation to conditions inaccessible to laboratory experiments, but appropriate for NEO deflection, is justified, especially for the related parameter studies.

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