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Low-Order Modeling of Micro-Flier Impact with Thin Stationary Targets[1] MARK FRY, KEITH GONTHIER, Louisiana State University — The impact of high-speed (500-1500 m/s), laser driven micro-fliers with thin energetic targets (10-100 μm) is being examined to characterize impact-induced heating and combustion of these materials. To guide development of experiments, a low-order (zero-dimensional) model is formulated to estimate ballistic performance for large dimensional parameter spaces in a computationally inexpensive manner. The model accounts in a simple way for both the early time system dynamics associated with wave propagation and the late time dynamics associated with target penetration and perforation. The model is currently being validated against impact data for larger scale flier-target configurations, and is being used to give predictions for micro-scale configurations. Preliminary predictions for the impact of aluminum micro-fliers with thin steel targets indicate that the ballistic behavior is sensitive to micro-flier mass and geometry. The imaging of post-impact target coupons will be used to gain insight into deformation and failure modes, and to enhance model development.

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