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NUMERICAL OPTIMIZATION OF ENHANCED HYPERVELOCITY LAUNCHER

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ABSTRACT

The Eulerian code Multi-Fluid Piecewise Parabolic Method is employed to investigate the effect of dimensions of the impactor on the velocity and planarity of the flier plate. A convex impactor is carried out to further improve the planarity and velocity, while keeping the impact velocity constant. Results indicate that 12 percent increase in flier velocity of the central position and about 70 percent improvement in the planarity at the muzzle of the extensional barrel is present in the optimal model considering the limited launch capability of the two-stage light-gas gun. In addition, the convex impactor leads to a conspicuous increase of the flier velocity in central part but a slightly increase of the velocity in other portions, which results in the variation of the planarity. However, the planarity of the flier plate at a given time or position can be improved by tuning the dimensions of the impactor, and the flier plate keeps relative flat in a short duration. Further studies will concern on the decrease of the velocity difference in order to perform the EOS studies.