

Abstract Submitted
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Physics of Intact Capture of Cometary Coma Dust Samples¹

WILLIAM ANDERSON, Los Alamos National Laboratory — In 1986, Tom Ahrens and I developed a simple model for hypervelocity capture in low density foams, aimed in particular at the suggestion that such techniques could be used to capture dust during flyby of an active comet nucleus. While the model was never published in printed form, it became known to many in the cometary dust sampling community. More sophisticated models have been developed since, but our original model still retains superiority for some applications and elucidates the physics of the capture process in a more intuitive way than the more recent models. The model makes use of the small value of the Hugoniot intercept typical of highly distended media to invoke analytic expressions with functional forms common to fluid dynamics. The model successfully describes the deceleration and ablation of a particle that is large enough to see the foam as a low density continuum. I will present that model, updated with improved calculations of the temperature in the shocked foam, and show its continued utility in elucidating the phenomena of hypervelocity penetration of low-density foams.

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