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Drop formation following bursting of molten steel thick liquid films in a steel plate illuminated by a high energy laser[1] MARY LANZEROTTI, United States Military Academy, K. BRAKKE, Susquehanna University, K. ALLEN, J. HARTKE, United States Military Academy, A. HIRSA, Rensselaer Polytechnic University — This talk presents preliminary observations of the formation of a single liquid drop of molten steel following bursting of a thick liquid film formed by illumination of a thin vertical steel plate by a 1075-nm continuous-wave 1000W Ytterbium fiber laser. Images of the initial hole captured by a high-speed digital camera at room temperature conditions show a rapidly expanding hole. Liquid then gathers at the lower part of the hole, forming a liquid lump where the pre-burst bulge was located. The liquid lump vibrates twice as it settles into a sphere. Gravity pulls the liquid drop down, to form a neck between the rim of the hoop and the drop. The neck pinches off, detaching a drop. The neck retracts slightly before it freezes with a small droplet that appears to form at the bottom of the neck before the neck freezes. The falling drop oscillates as it falls until it hits the mount surrounding the steel plate. The high-speed images also show an ejected droplet that is launched and then falls, apparently in front of the plate. No satellite drops are observed.

[1]Army JTO, ARO

M. Lanzerotti
United States Military Academy

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