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Detection of a liquid-metal surface using the DLP technique MARTIN HILLENBRAND, ROBERT STIEGLITZ, ANDREAS CLASS, Forschungszentrum Karlsruhe, PAUL NEITZEL, Georgia Tech — Numerous new reactor concepts (e.g., Accelerator-Driven Systems) utilize the impact of a high-energy particle beam onto a liquid-metal surface as a vital part of the reactor design. Consequently, there is a need to detect the liquid-metal surface with high spatial and temporal resolution. The detection of liquid-metal surfaces has inherent difficulties that limit the use of common measurement techniques, e.g., high reflectivity in vacuum coupled with high flow velocity and rapid surface motion. In order to develop a method capable of meeting the needs of such systems, a projection method has been modified by adding a second (transparent) screen. The resulting Double-Layer-Projection (DLP) technique was applied to obtain spatially and temporally resolved measurements of a circular hydraulic jump using the eutectic liquid GaInSn as the test fluid. The jump position and height were measured with the required accuracy of ± 0.3mm. The velocity of the dominant waves and the superimposed high-frequency disturbances of the liquid metal surface were also detected.

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