Abstract Submitted
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Flyer plates accelerated by the pulsed power driven explosion of underwater planar wire arrays[1] SAVVA THEOCHAROUS, DAVID YANUKA, SIMON BLAND, Imperial College London — We present results for a novel flyer acceleration method in which a planar wire array in a waterbath is exploded using a current pulse, generating an approximately planar shock in the water that reaches and accelerates the flyer. Flyer plate impact is of interest for material equation of state research, and more recently for a novel fusion ignition scheme being developed at First Light Fusion Ltd. This method may allow more control over the spatial and temporal profile of the force accelerating the flyer than other methods such as magnetic stripline acceleration by controlling the current path using wires of varying characteristics and utilizing shock reflections. Results indicate velocities of around 1100 m/s for a 10 mm^2, 1 mm thick aluminium flyer, using a current pulse with peak current of 600 kA and rise time of 500 ns. Effect of flyer thickness and material have also been investigated. Reflected shock waves have been shown to provide initial acceleration as in a reverberation cavity. Work is in progress to further diagnose the characteristics of the planar shock launched from the wire array using x-ray radiography, and to simulate the system to further understand material conditions.

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