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Generation of cylindrically convergent shockwaves in water on the MACH facility[1] SIMON BLAND, Institute of Shock Physics, Imperial College London, YA. E. KRASIK, D. YANUKA, Technion, Haifa , R. GARDNER, J. MACDONALD, Institute of Shock Physics, Imperial College London, A. VIROZUB, S. EFIMOV, S. GLEIZER, Technion, Haifa, N. CHATURVEDI, Institute of Shock Physics, Imperial College London — We report on the first experiments utilizing MACH facility at Imperial College London to explode copper wire arrays in water, generating extremely symmetric, cylindrical convergent shockwaves. The experiments were carried out with 10mm diameter arrays consisting of 60 x 130m wires, and currents ¿500kA were achieved despite the high inductance load. Laser backlit framing images and streak photography of the implosion showed a highly uniform, stable shockwave that travelled towards the axis at velocities up to 7.5kms-1. For the first time, imaging of the shock front has been carried at radii ¡ 0.5mm, and there is strong evidence that even at radii ¡0.1mm the shock front remains stable, resulting in a convergence ratio of 50:1. 2D hydrodynamic simulations that match the experimentally obtained implosion trajectory suggest pressures of ¿1Mbar are produced within 10m of the axis, with water densities 3gcm-3 and temperatures of many 1000s of Kelvin. The results represent a significant step in the application of the technique to drive different material samples, and calculations of scaling the technique to larger pulsed power facilities are presented.

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Simon Bland
Imperial College London

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