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Convergent shock tube: new design, first results

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This paper reports on the progress of the convergent shock tube (CST) project. The latest results from the old CST are presented and some of its limitations noted. A triangular notch perturbation experiment was presented at the last meeting of this workshop (Holder et al. 2003), an improved set of experimental results will be presented compared to results from the TURMOIL 3D large eddy simulation (LES). The limitations of the old CST were used as a basis for its redesign.

Details of the new design are discussed to illustrate the problems highlighted in conducting experimental work with the CST. Some information on the manufacture of the new facility will be discussed focusing on the areas where machining limitations had a potential to compromise the design and the solutions found.

Commissioning of the new facility will be discussed and comments made on its performance and operational issues. Shadowgraphy images of the shock profile in the test cell will be presented. An initial series of unperturbed Richtmyer-Meshkov instability experiments featuring a plane – plane interface, air / dense gas / air configuration will be presented as a benchmark for subsequent perturbed mix experiments.

References

Holder, D.A., Smith, A.V., Barton, C.J. and Youngs, D.L., 2003 Mix experiments using a two-dimensional convergent shock-tube. Laser and Particle Beams *21*, 403-409.