# Formation of jets by collision of shock waves

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Plasma jets in laboratory experiments are usually obtained by the collision of hot plasmas[1] with different geometries. Another way to produce a plasma jet is by cumulative effect during the collision of shocks waves. These kinds of jets have a role in some observed astrophysical phenomena and in inertial confinement fusion (ICF)[2]. We present here simulations and analysis of experiments performed by laser irradiation of the outer surface of conical and planar targets [3,4]. The main advantages of this configuration are decouple the mechanism of shock wave generation, usually done by laser ablation, from the region where the jet is produced, and to better control of timing of the jet formation and the density of this jet.

We study different materials of the target (DT, Al and Au), and several configurations changing the angle of the cone. We also consider a curved surface that allows changing the angle of interaction between the shock waves. The equation of state has a lot of influence at moderate velocities, associated with moderate temperatures. We also analyze the role of energy radiation transport in the production of the jet, and on the shape of the jet itself. The main goal of this work is to obtain jets of high kinetic energy and momentum. Specifically we try to get jets with velocities higher than $10^3$ km/s and densities not too lower than 1000 kg/m$^3$

Simulations are performed with a 2D AMR radiation transport code (ARWEN) with multimaterial tracking. The region where the jet is produced is small as compared with the target, and we need enough resolution to observe fluid structures as detached shocks or small jet aspect ratios.

References

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