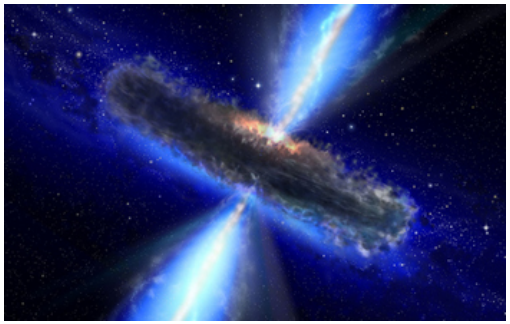
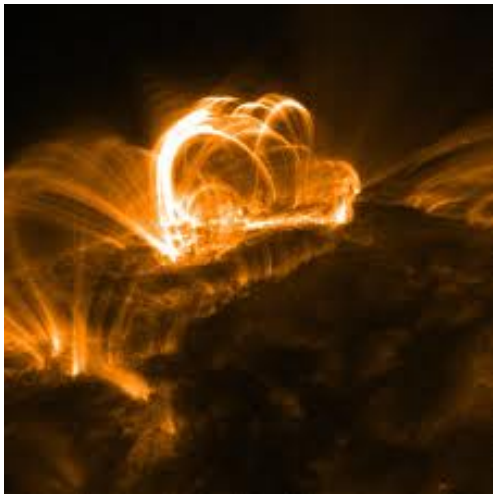
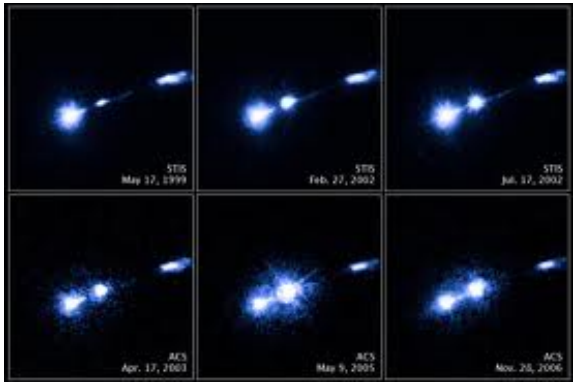
Initial 3D Plasma jet and disk assembly experiments on OMEGA







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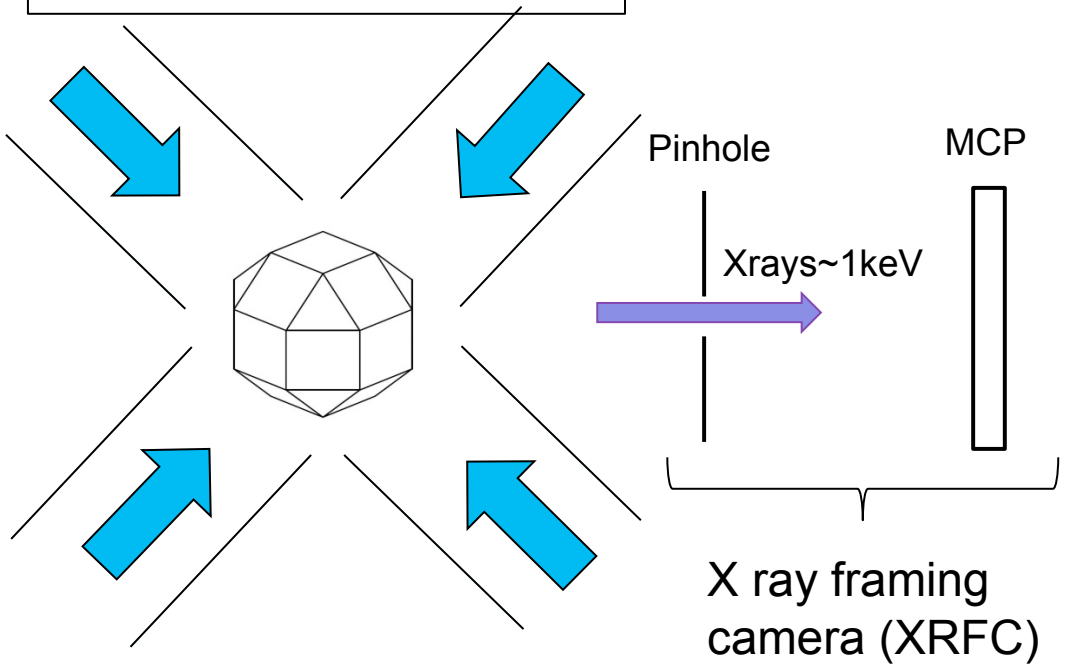
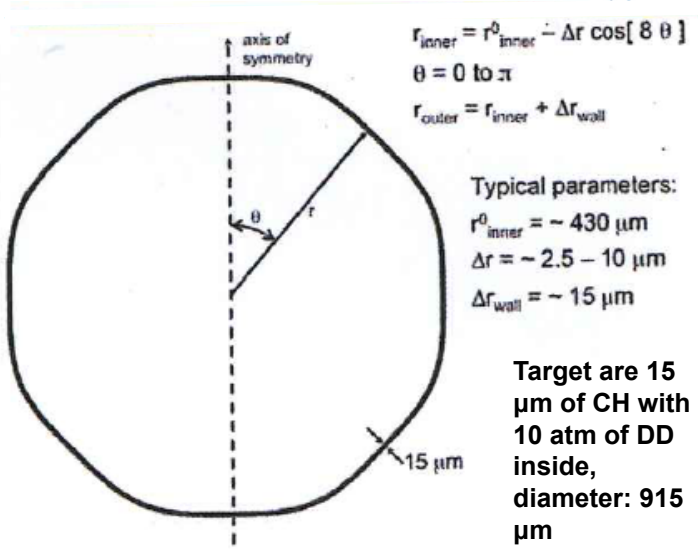
The experiment was set up to measure the growth of the initial P-8 perturbation in the radius by Rayleigh Taylor instability

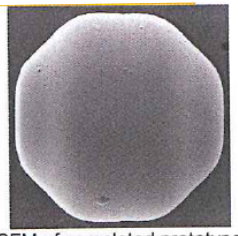
- 60 beams, 380J/beam
- SG1018:1ns,square pulse, SSD on
- XRFC:TIM2





Target are 15 μm of CH with 10 atm of DD inside, diameter: 915 μm

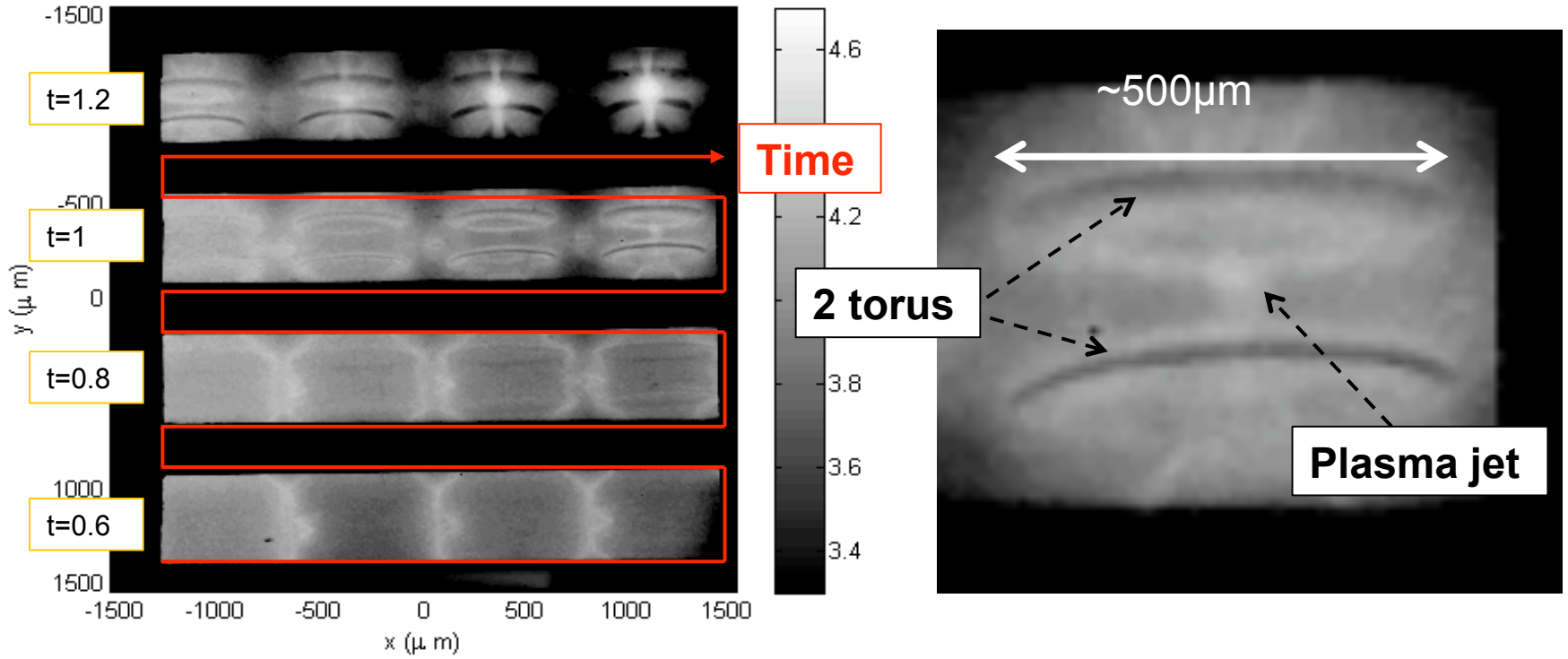
machined mandrel ready for GDP overcoat



SEM of completed prototype GDP shell (Jan 2011)

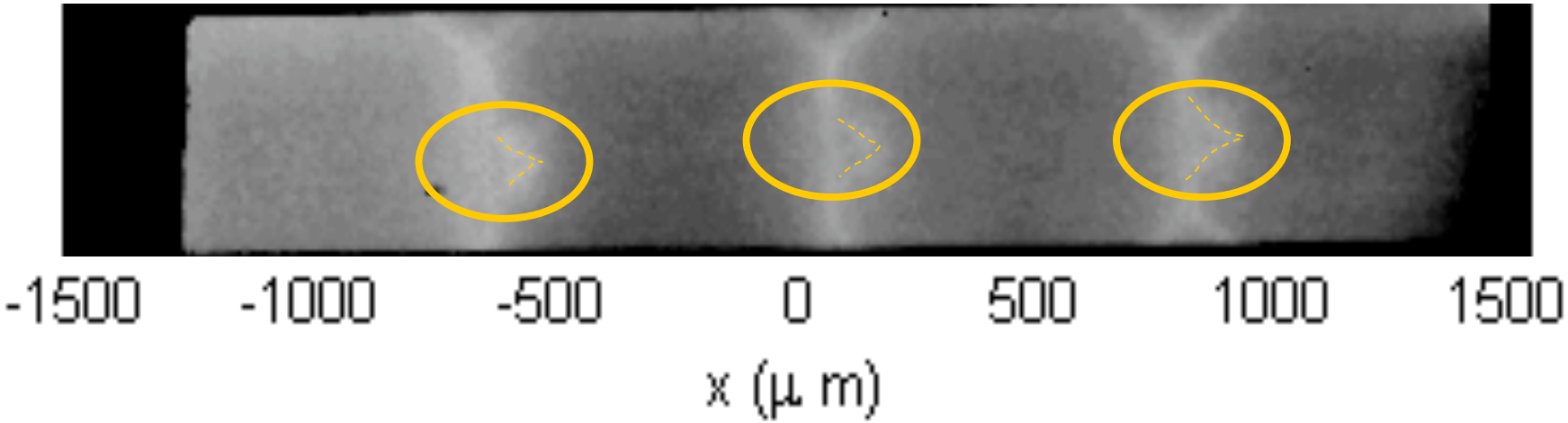
The XRFC permit to measure the position of the critical density during the compression very accurately (Δt~10 ps, Δx~5 μm)

During the experiment, the evolution of the target during its compression is observed at 16 different time



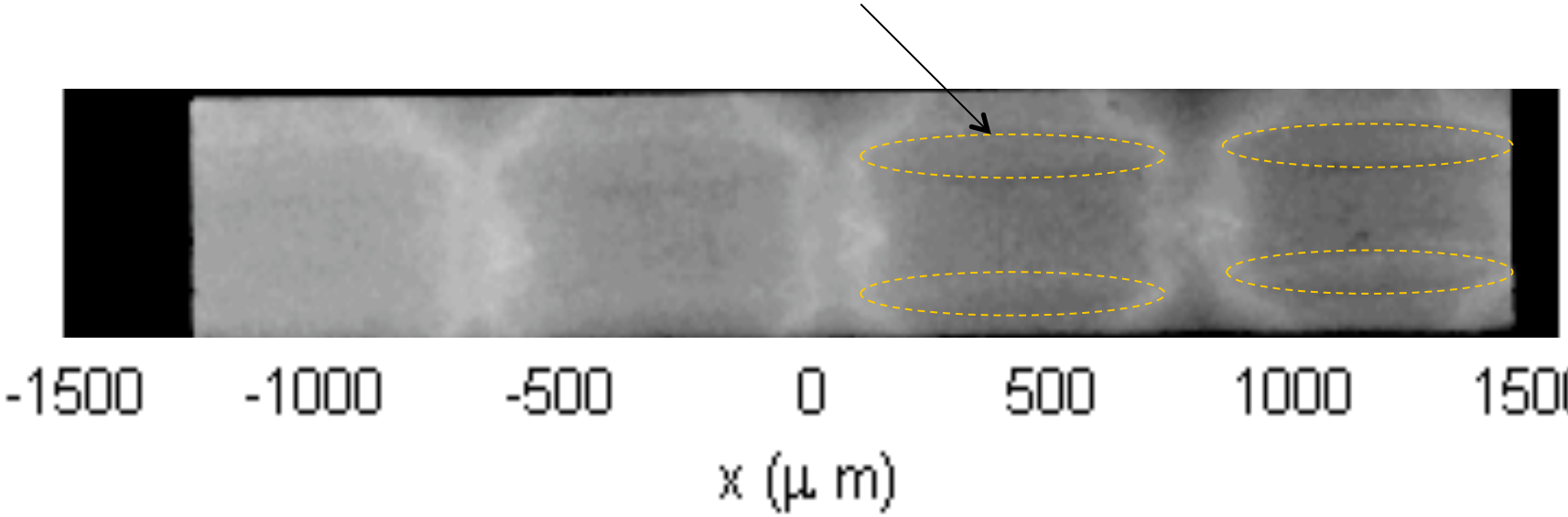
We observe the apparition of 4 torus and a plasma jet in the middle!!

1st phase: Growth of the nonuniformities



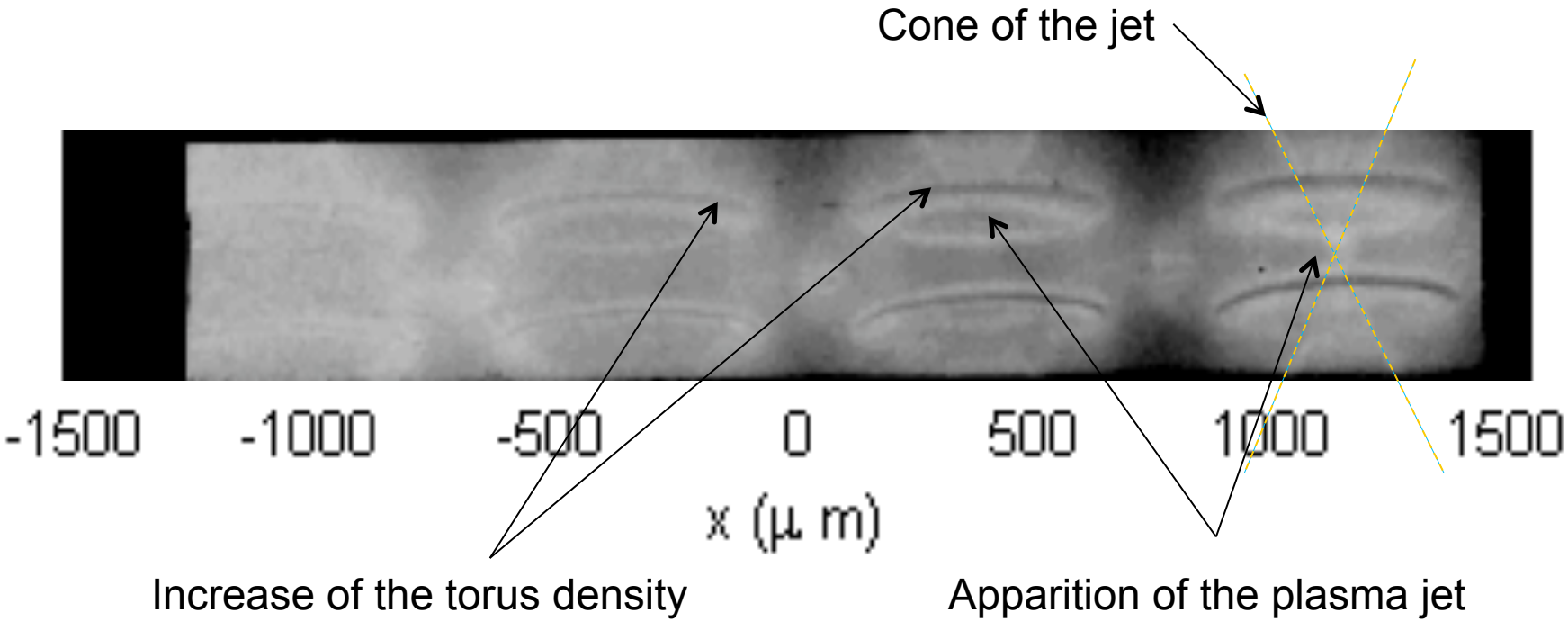
2nd phase: Apparition of the Torus and accretion of plasma

The density of the torus can be measured using the absorption



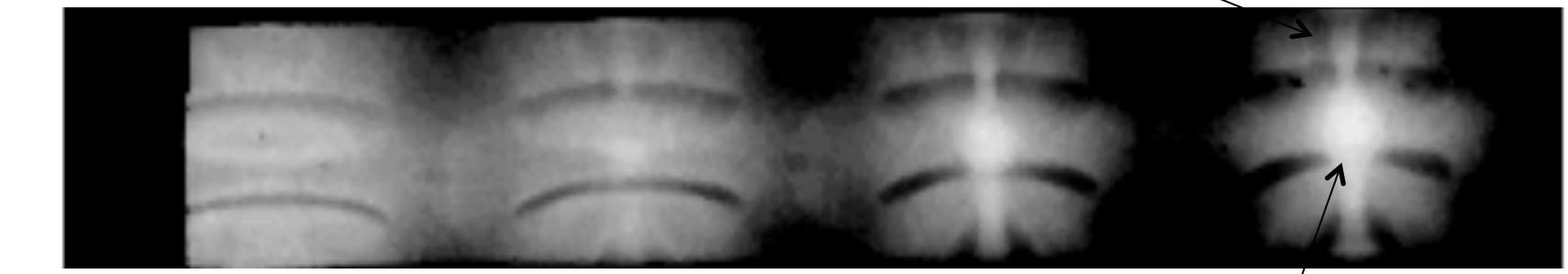
The torus that correspond to accretion of plasma backlight the x-rays emitted by the backside of the target

3rd phase: Apparition of the plasma jet



Is the apparition of the plasma jet due to hydro? Or confinement by magnetic field?

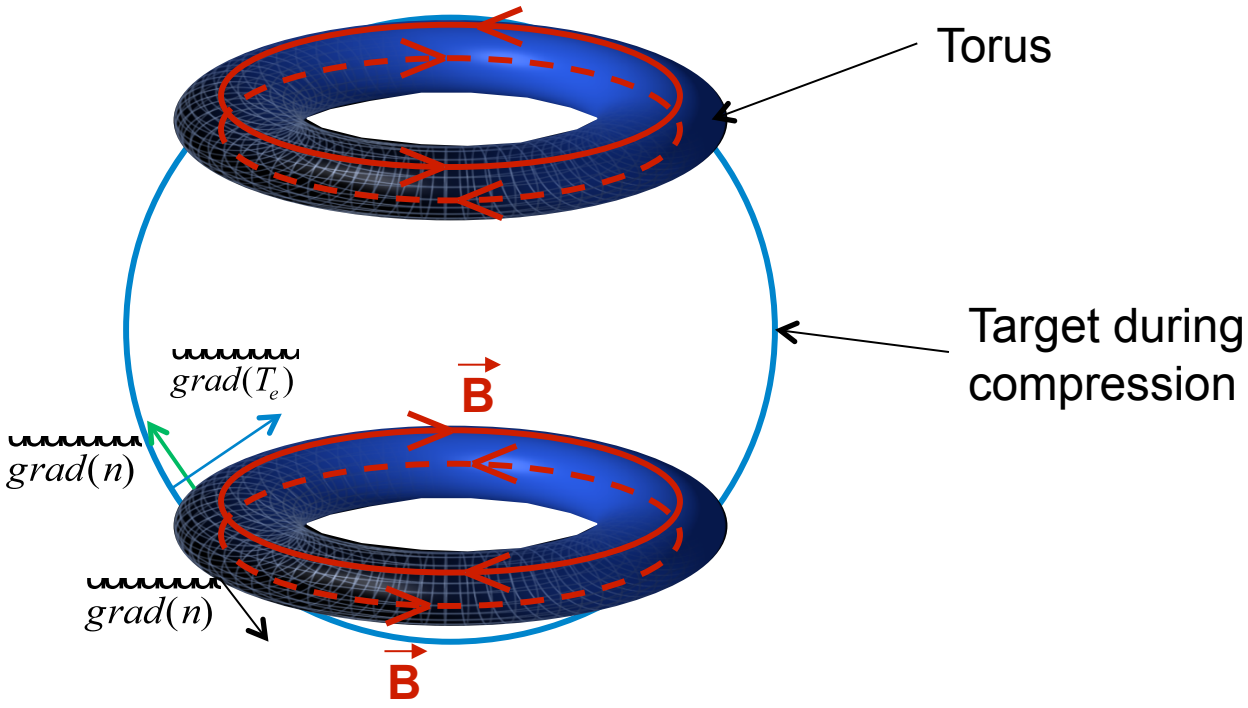
4rd phase: Evolution of the jet



The jet seems to be amplified during the compression

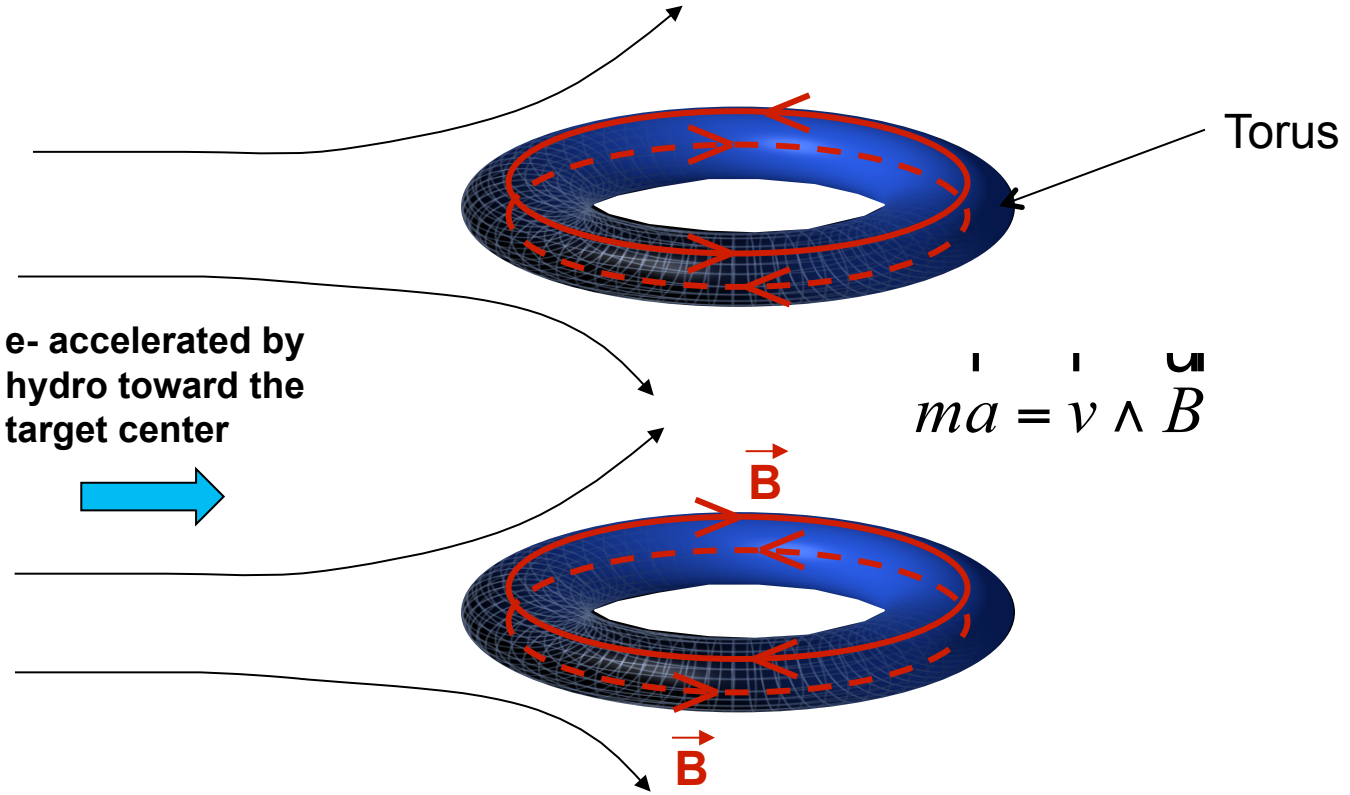
Magnetic confinement of the plasma jet?

$$\vec{B} = grad(n) \wedge grad(T_e)$$



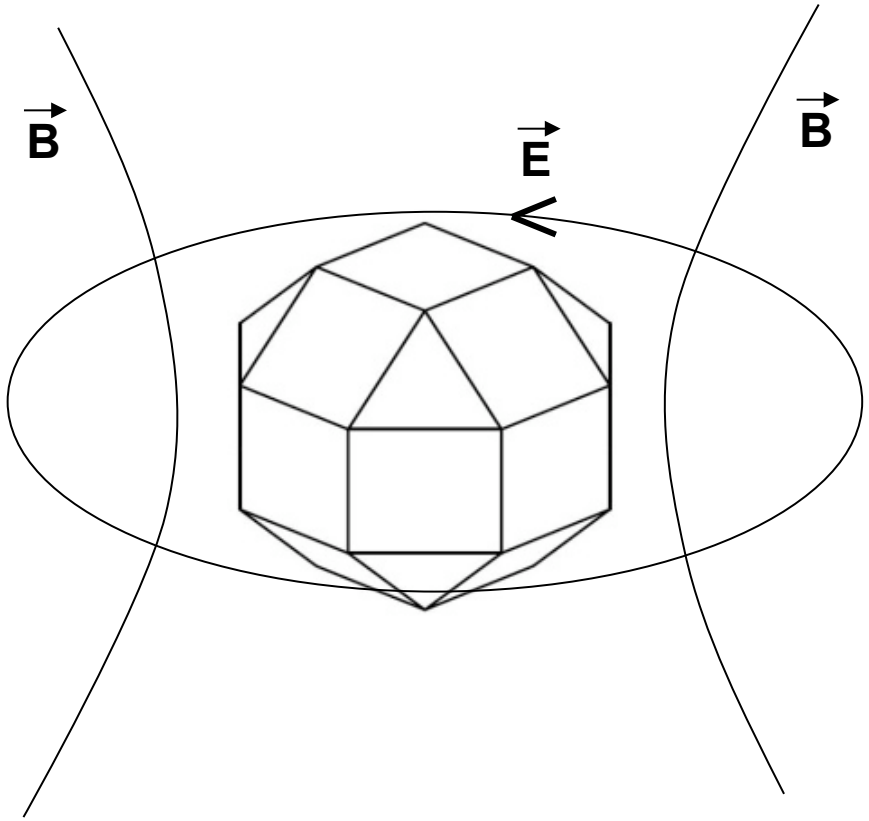
First calculations shows that the hydro induce two opposite magnetic fields on the surface of the torus

Magnetic confinement of the plasma jet?



The magnetic field could induce the plasma jet?

Other possibility : put a electromagnetic field around the target



B~30-35 MG
BUT PDD