Investigating the dynamics of magnetic reconnection driven by high-power laser

PLAS@PAR
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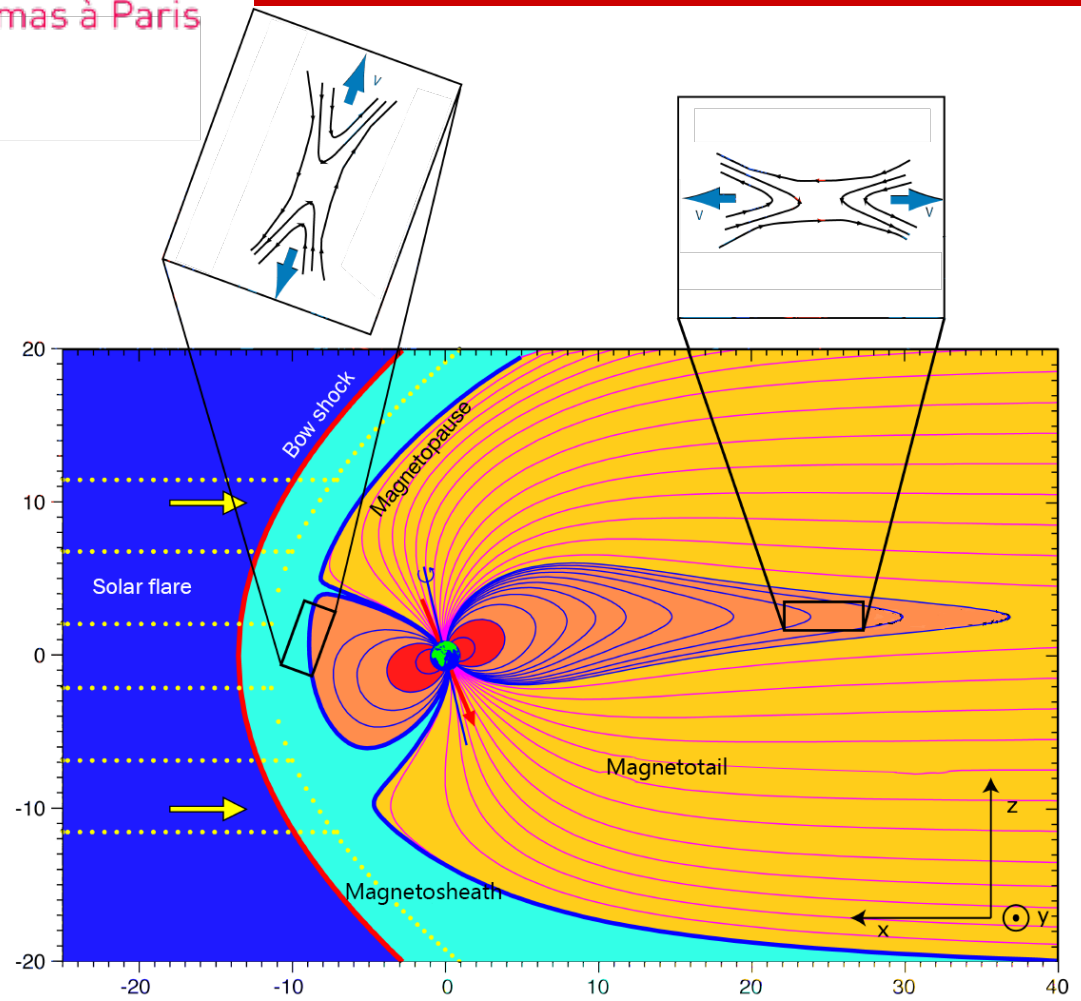

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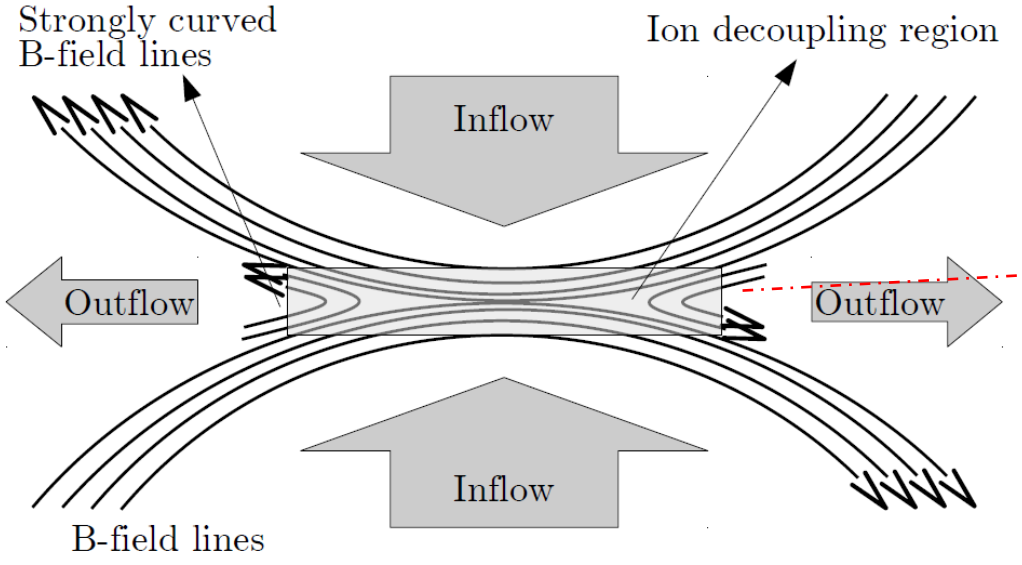
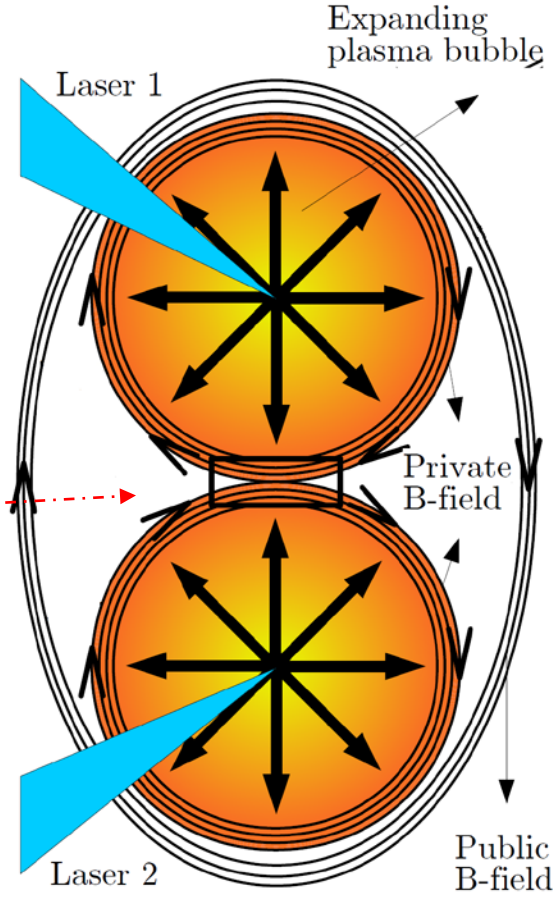
PRINCIPLE:

- Reconfiguration of the magnetic topology
- Transfer of magnetic energy to kinetic energy



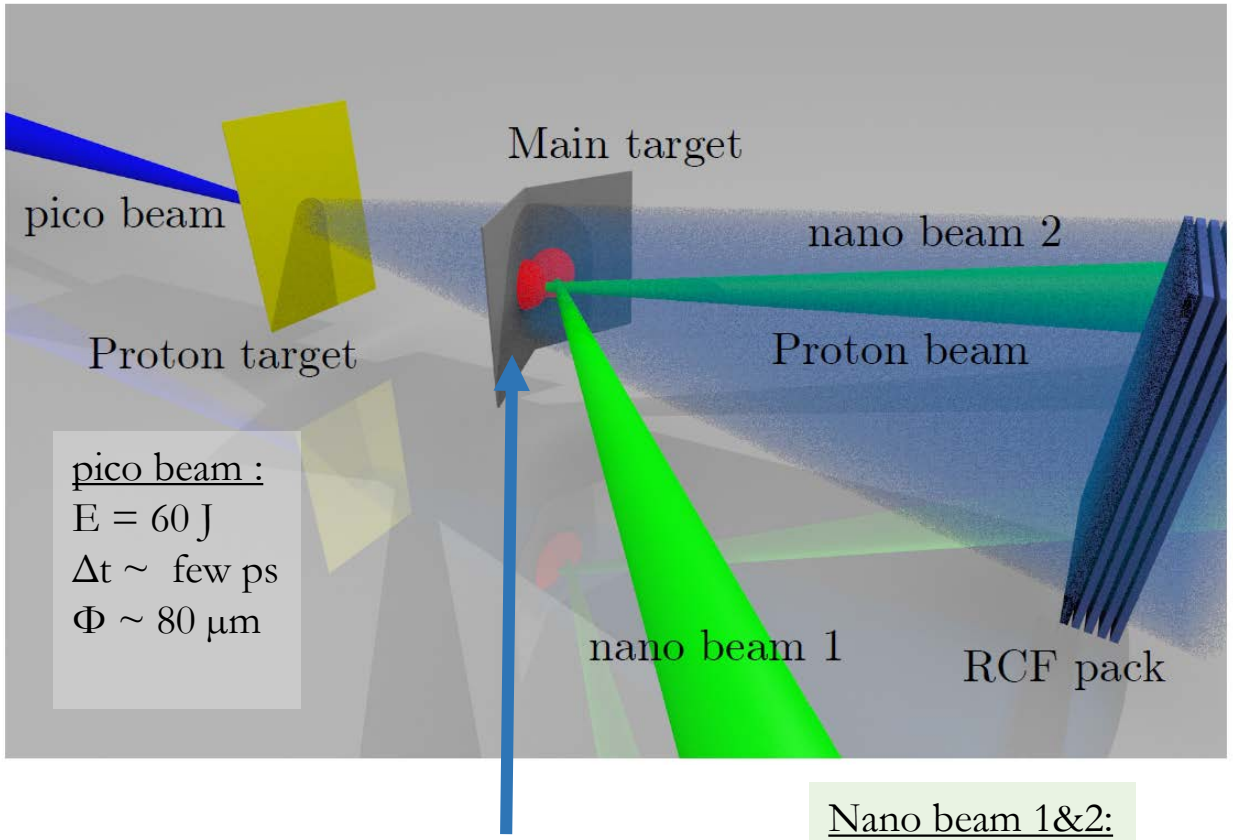
Magnetic reconnection with lasers:



Region of compresssion of the anti-parallel B-field lines

Focusing a high-power laser onto a solid target generates a plasma bubble with a megaGauss scale magnetic field

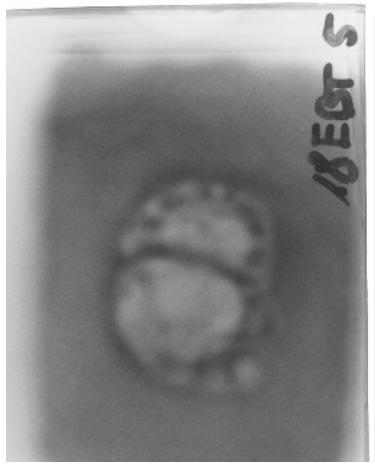
SETUP OF THE EXPERIMENT:



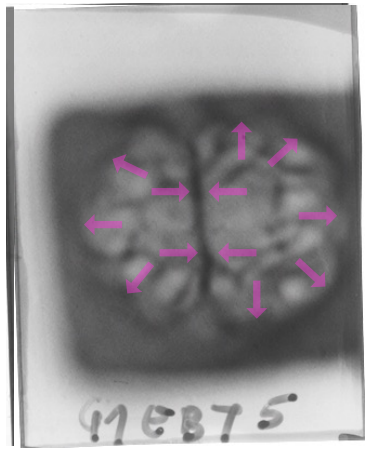
A proton beam allows to probe the spatial distribution of the megaGauss scale B field

Nano beam 1&2:
E = 200 J
Δt = 5 ns
Φ = 80 μm

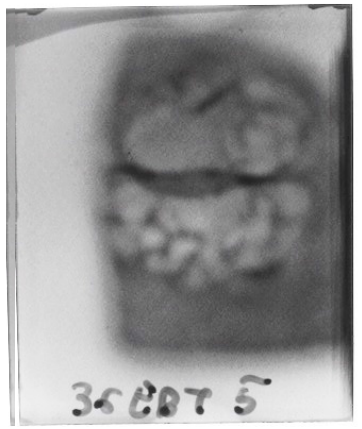
FIRST RESULTS IN PLANAR-PLANAR CASE:



t = 0.8ns : generation of the plasma bubbles and B field



t = 3.8ns : expansion of the plasma bubbles and compression of the B-field lines



t = 4.3ns : Beginning of the magnetic reconnection