A new idea “nugget” from FOCUS:

**Imaging high energy proton beams from laser plasmas**

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The figure shows shadow radiography of the proton beam produced in interaction of high-intensity laser with thin film target. This proton beam propagates in a forward direction normal to the target surface and has protons with energies up to 13 MeV. Proton imaging can be very useful for diagnostics of dense plasmas. This technique may allow us to explore for the first time the distribution of electric and magnetic fields in plasmas of laser-irradiated targets with high temporal and spatial resolution. The unique advantages of a laser-triggered proton source are: the small source size, leading to high spatial resolution in imaging applications; the short pulse duration, measured to be a few picoseconds; very simple absolute synchronization of these sources in pump-probe experiment; the low divergence and high brightness of the beam; and the long stopping range of 10–15 MeV protons, which leads to the possibility of penetrating reasonably thick objects.

**Imaging with proton beams**

- T-cube laser
- Thin film target
- Mesh
- Proton beam
- Radiochromic film

**Imaging of copper mesh:** period 30 μm, wire diameter 10 μm