

Detection of laser accelerated ions at the DRACO laser

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Compact accelerator?



Acceleration in a plasma!



High field strength possible!

Compact accelerator?

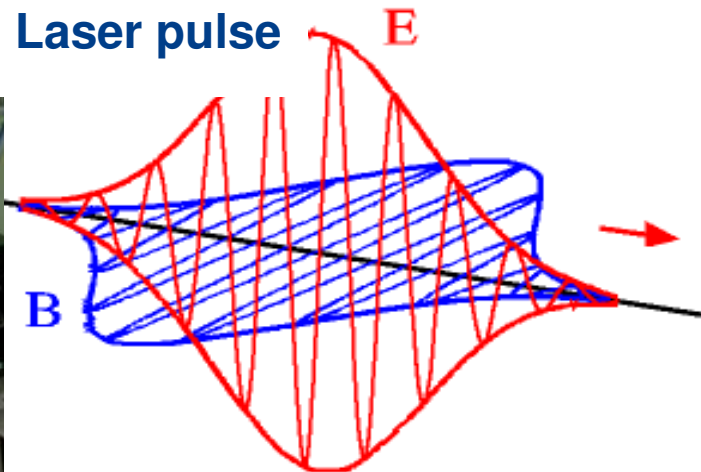


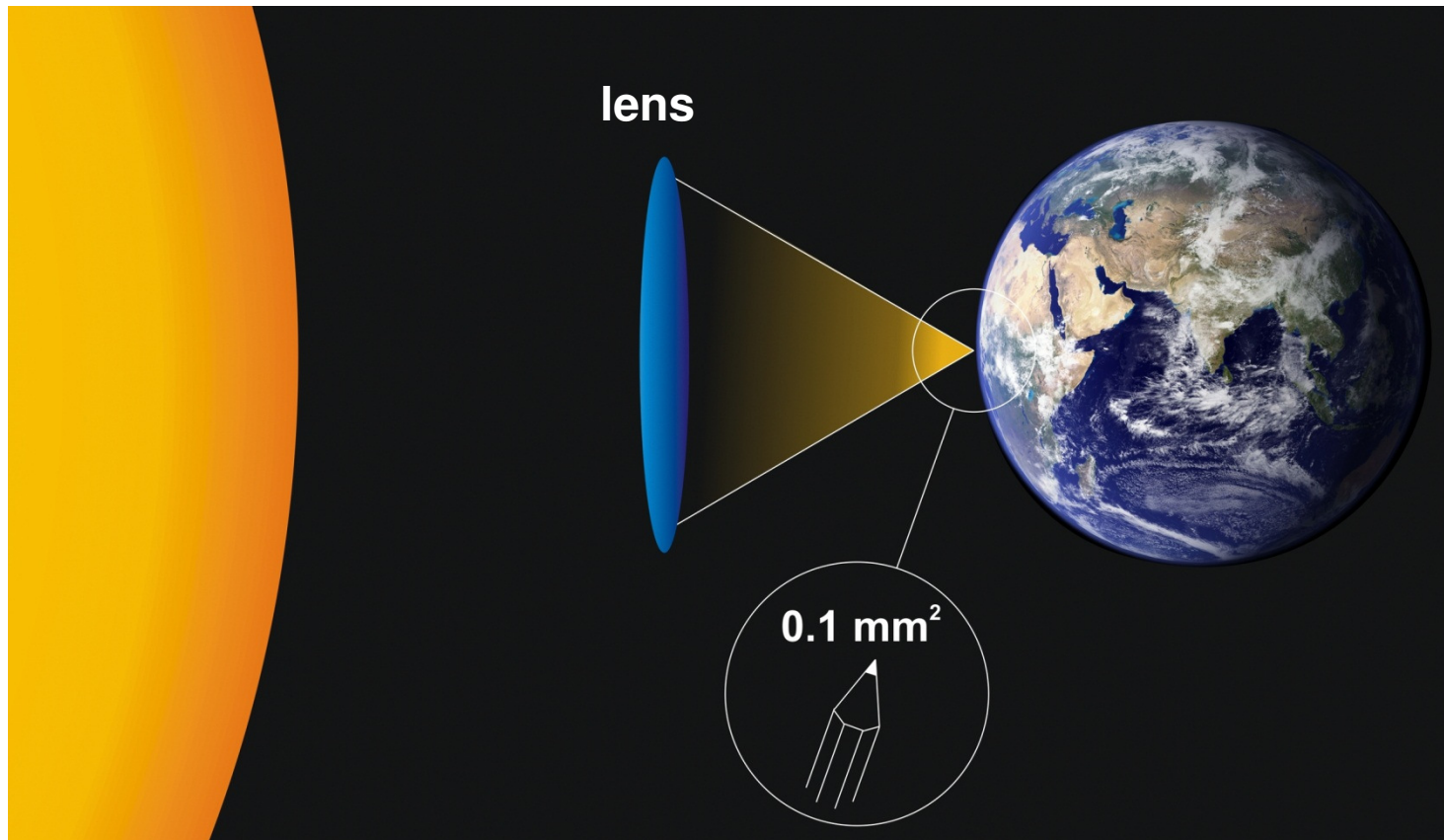
Acceleration in a plasma!



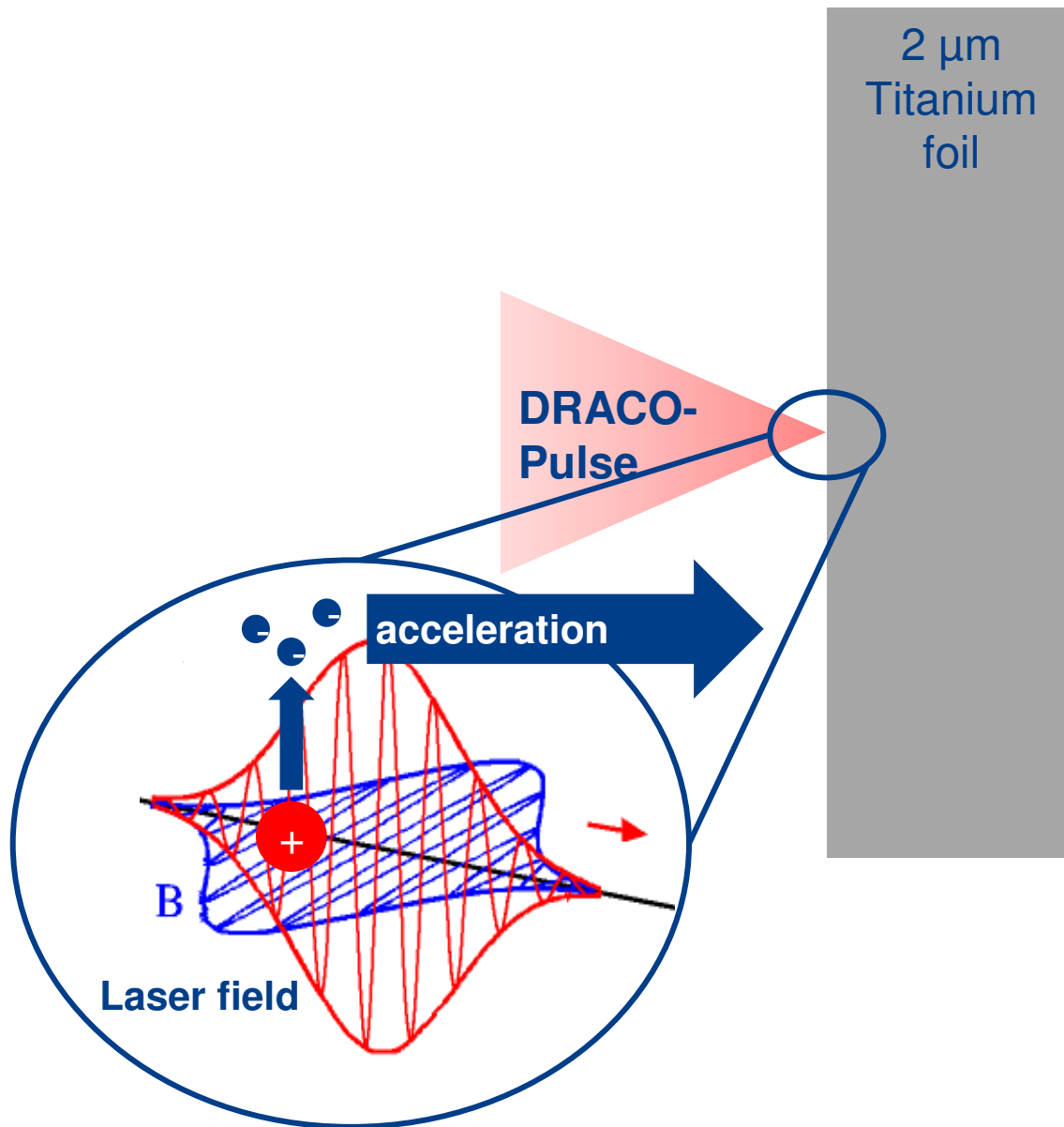
High field strength possible!

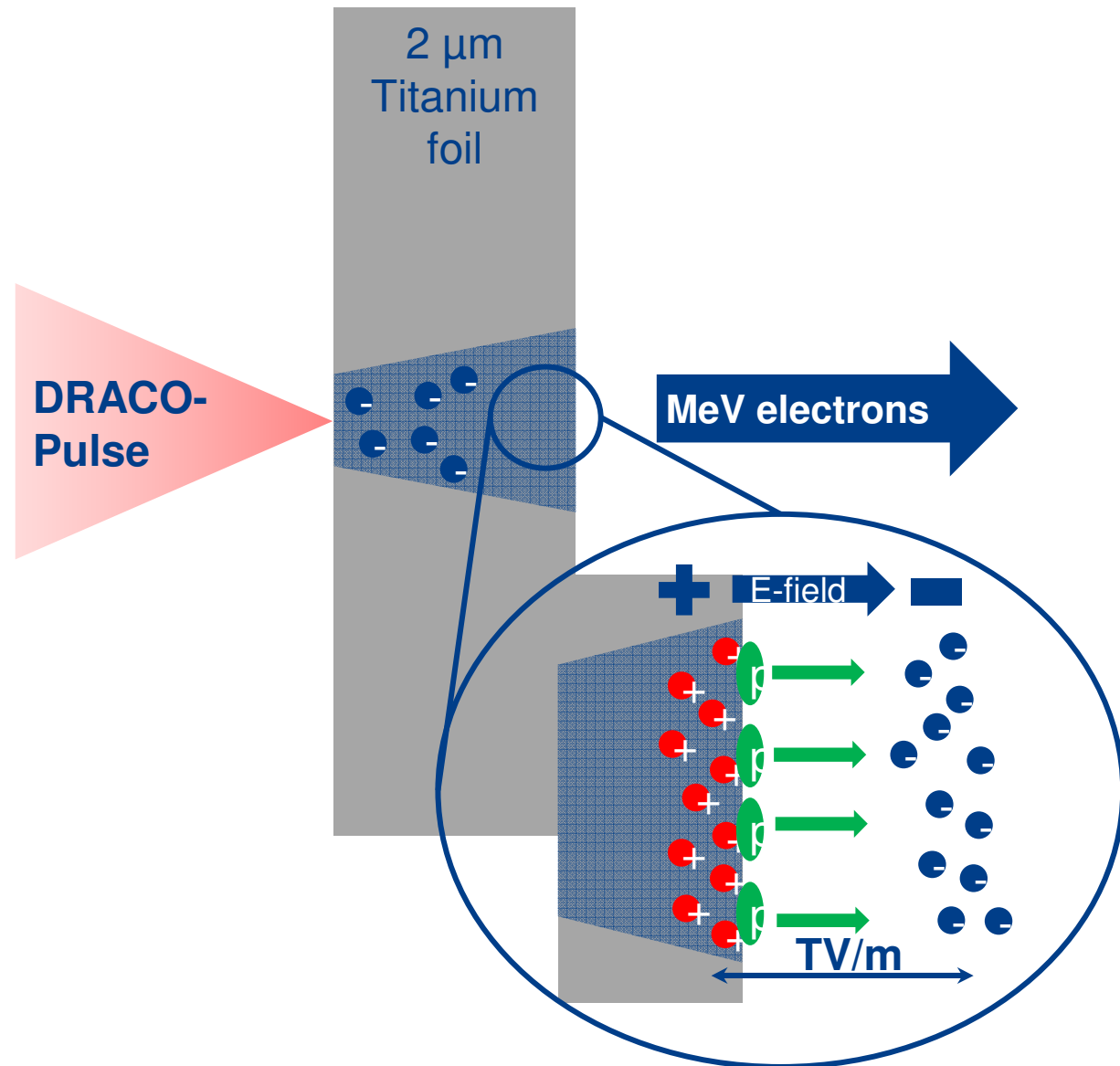
High intensity laser DRACO



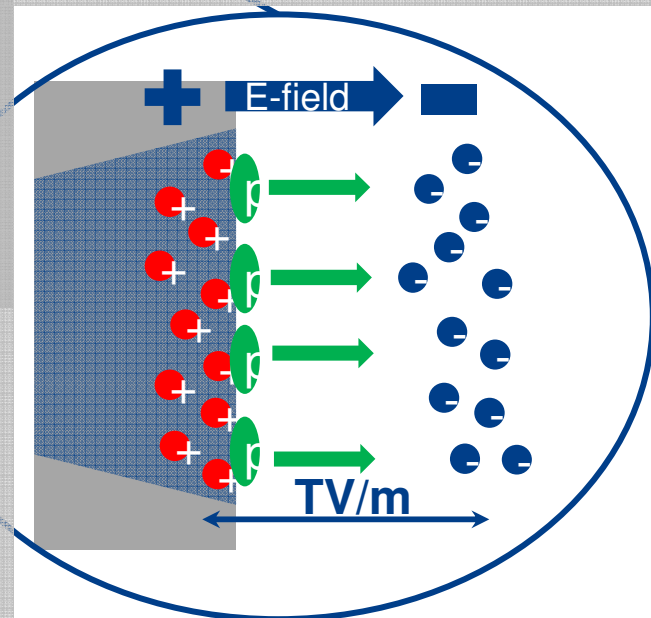


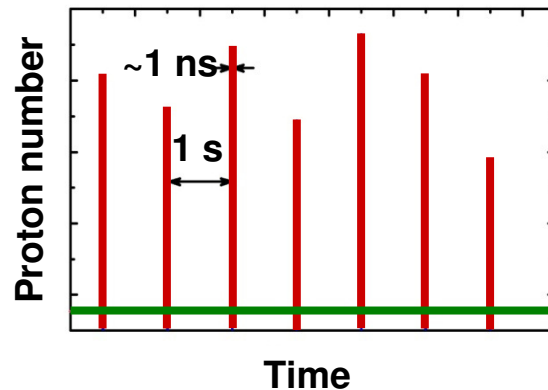
- 4 J Laser Energy
 - 30 fs ($1 \text{ fs} = 10^{-15} \text{ s}$) Pulse duration
 - 3 μm focus diameter
- } Intensity $\sim 10^{21} \text{ W/cm}^2$



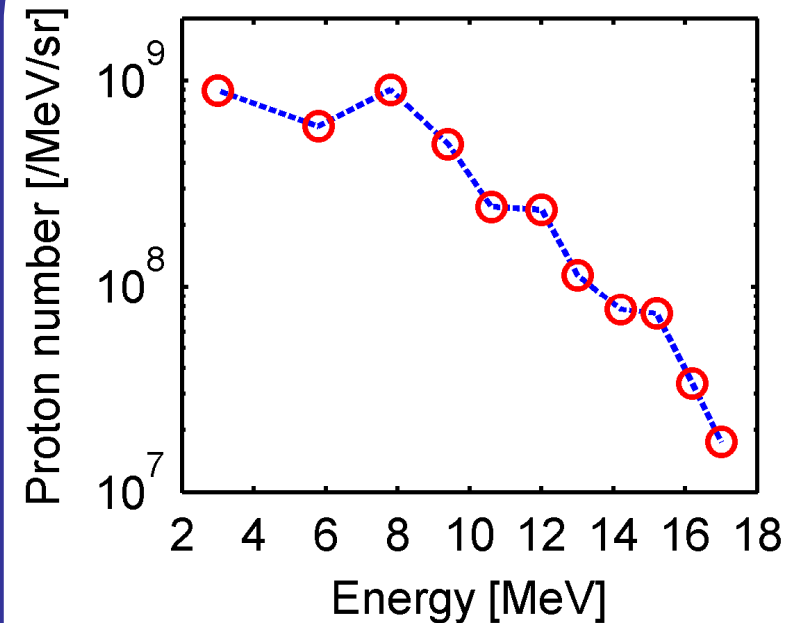


acceleration	conventional	laser
Electric field	MV/m	TV/m
Acceleration length	m	μm





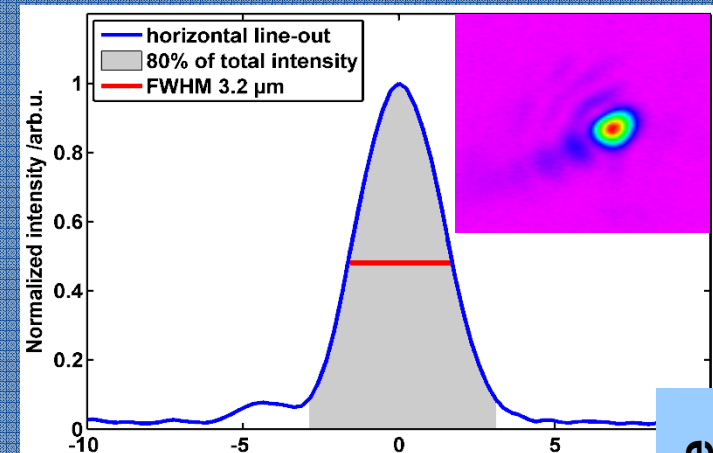
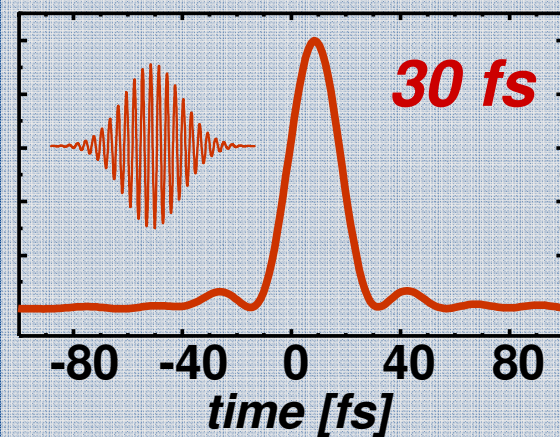
- high acceleration gradients: TV/m instead of MV/m \rightarrow compact sources
- 10^{10} to 10^{13} ions per pulse
- short ion pulses: femtosecond to picosecond at the source



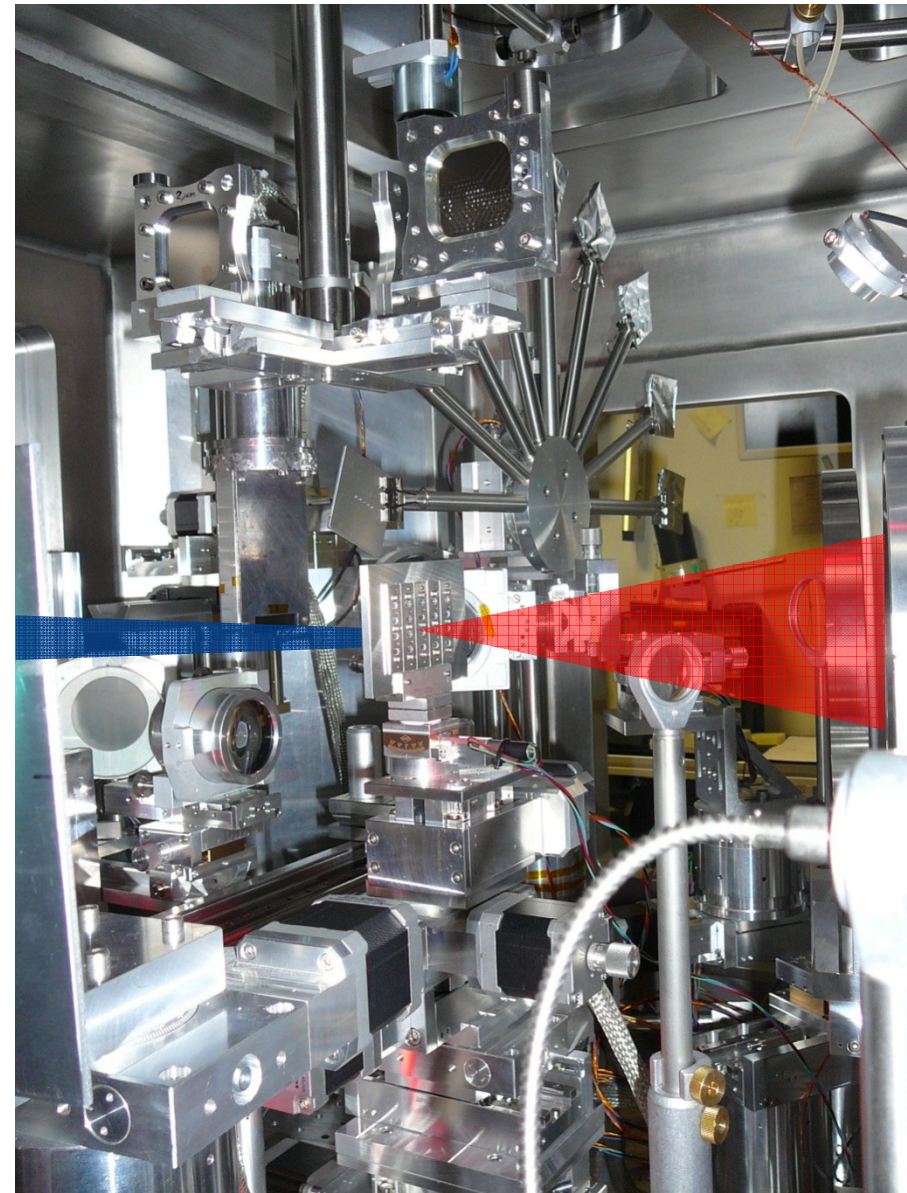
- exponential or at least broad energy spectra

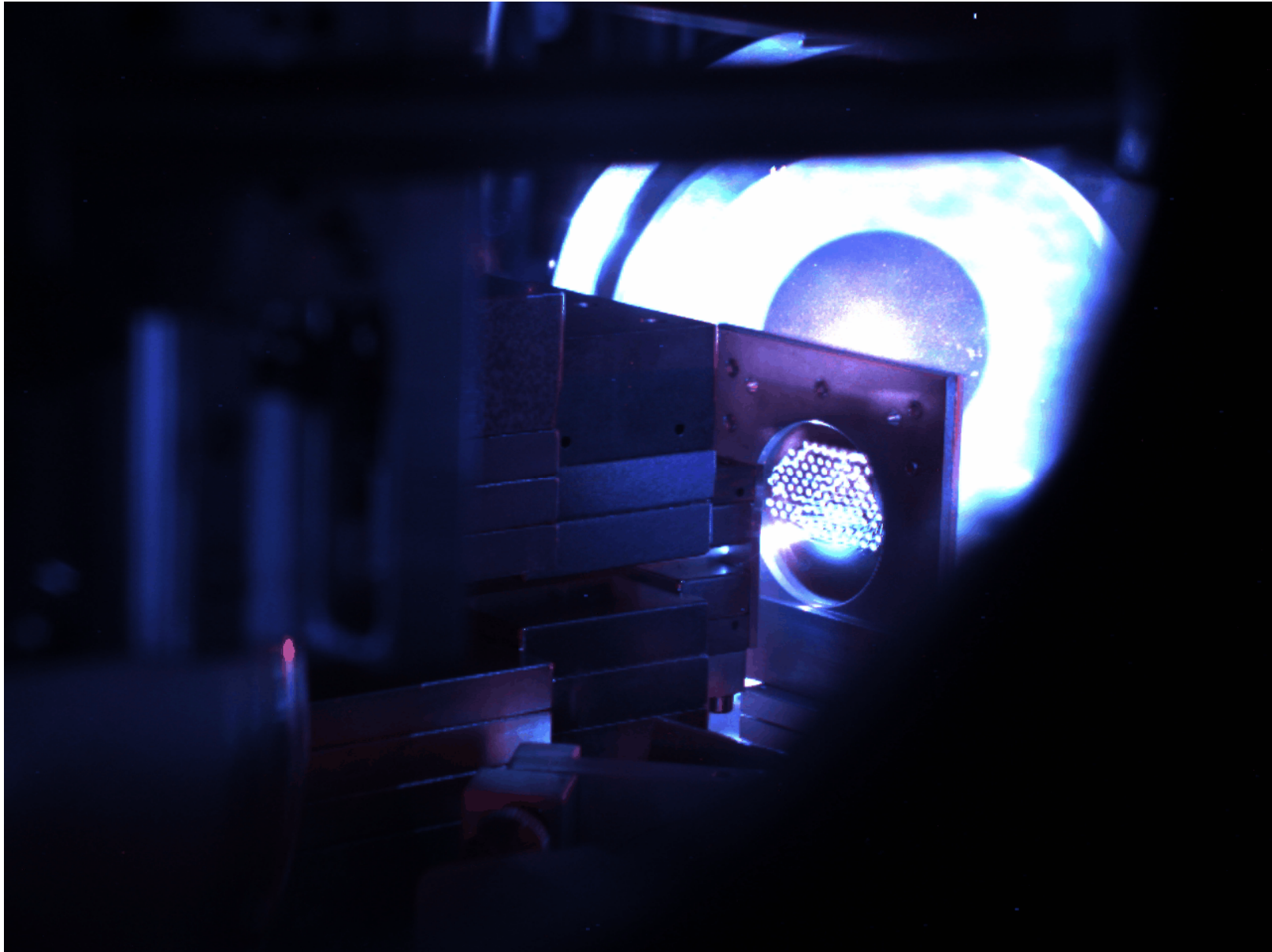
Status of the DRACO laser

**Ti:Sapphire
CPA laser**
2-3 J (on target)
 $I = 8 \cdot 10^{20} \text{ W/cm}^2$
ns-ASE contrast 10^{-10}



*Dresden laser acceleration source



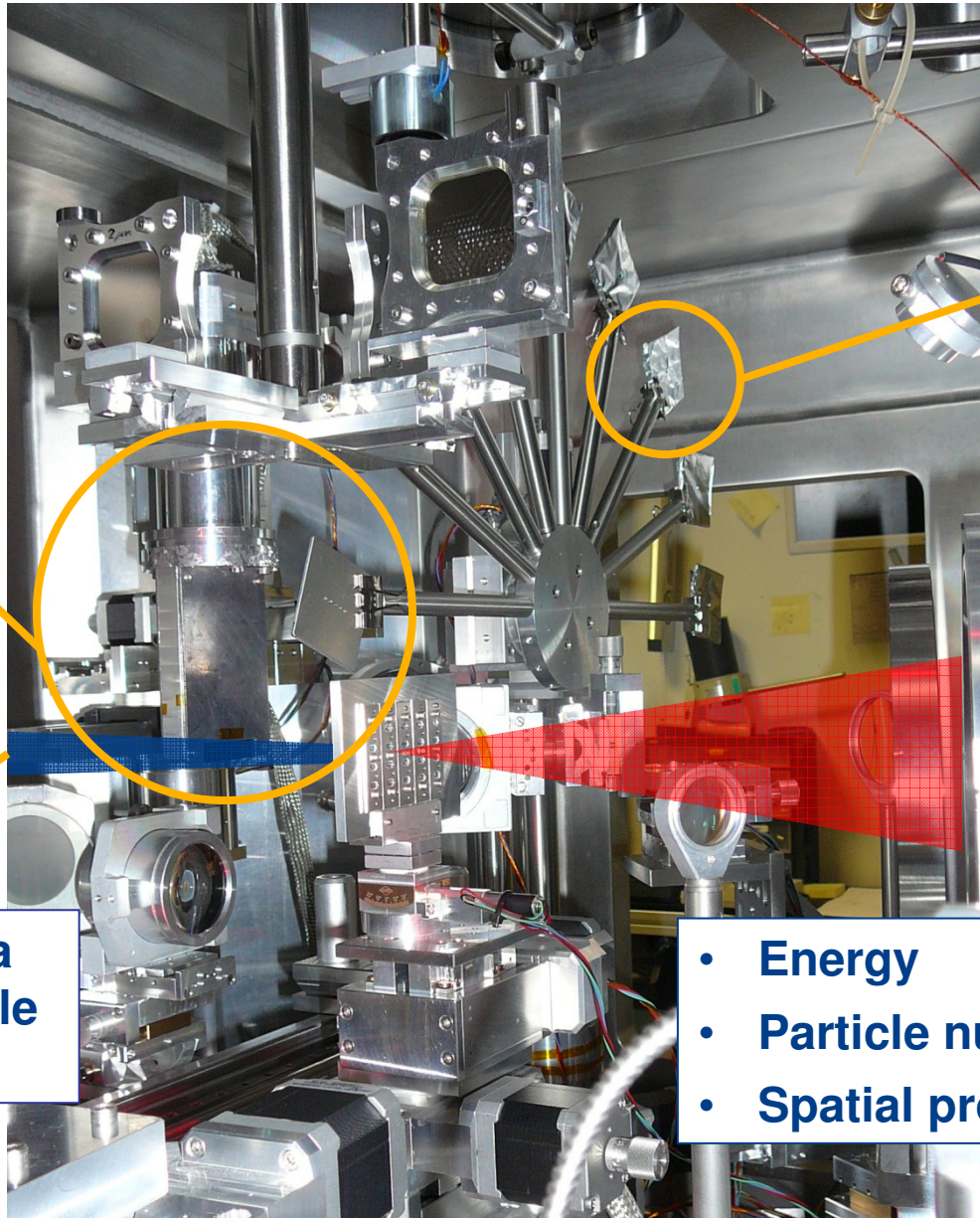


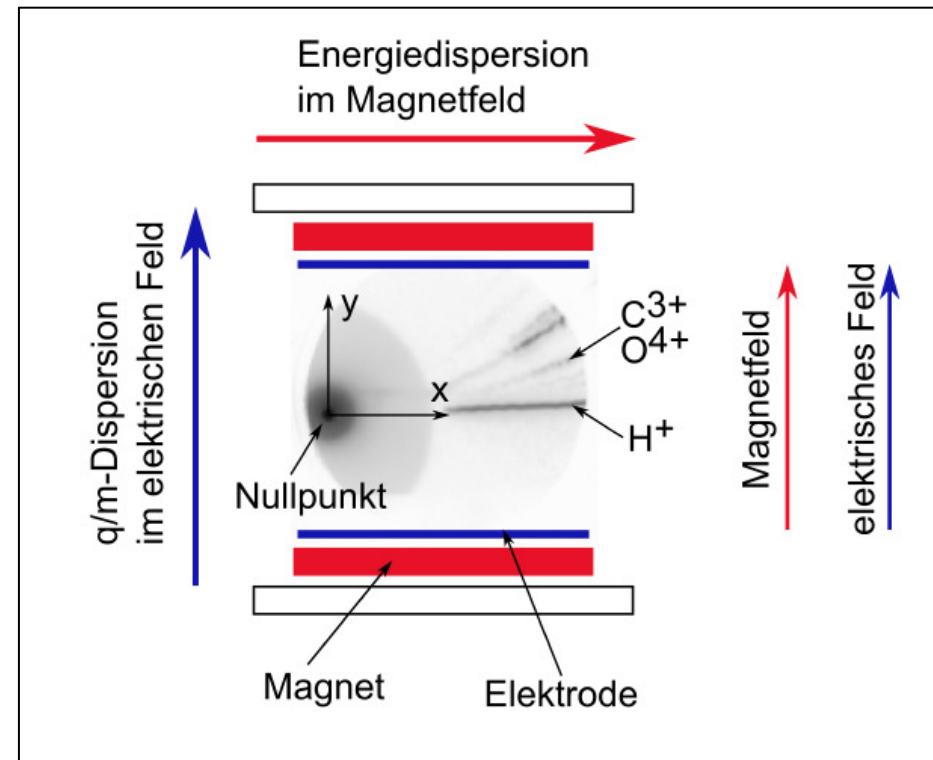
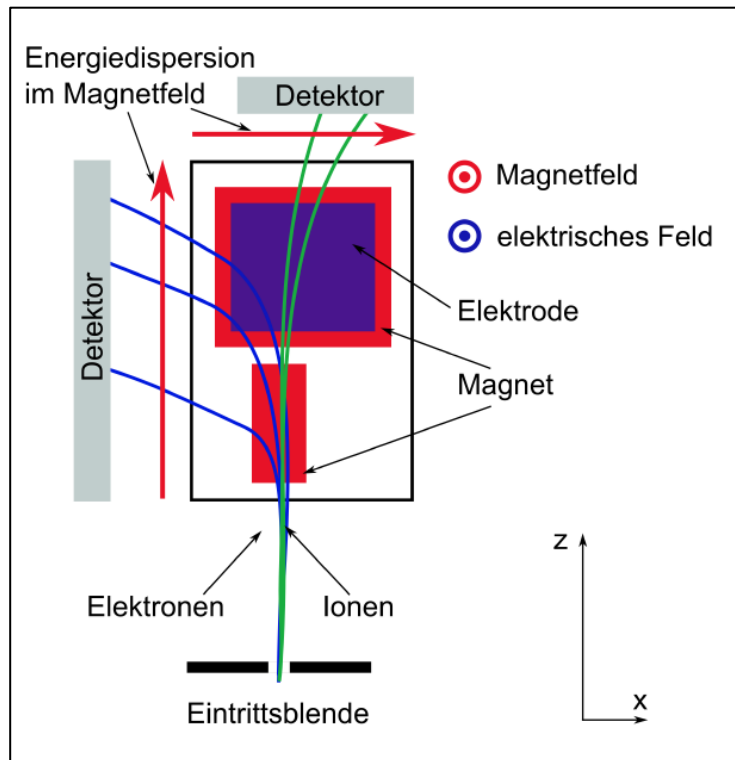
Stack scintillator
→1D
→online

**radiochromic
films**
→2D
→offline

Thomson-Parabola
→small solide angle
→online

- Energy
 - Particle number
 - Spatial profile
- } **Spectrum**



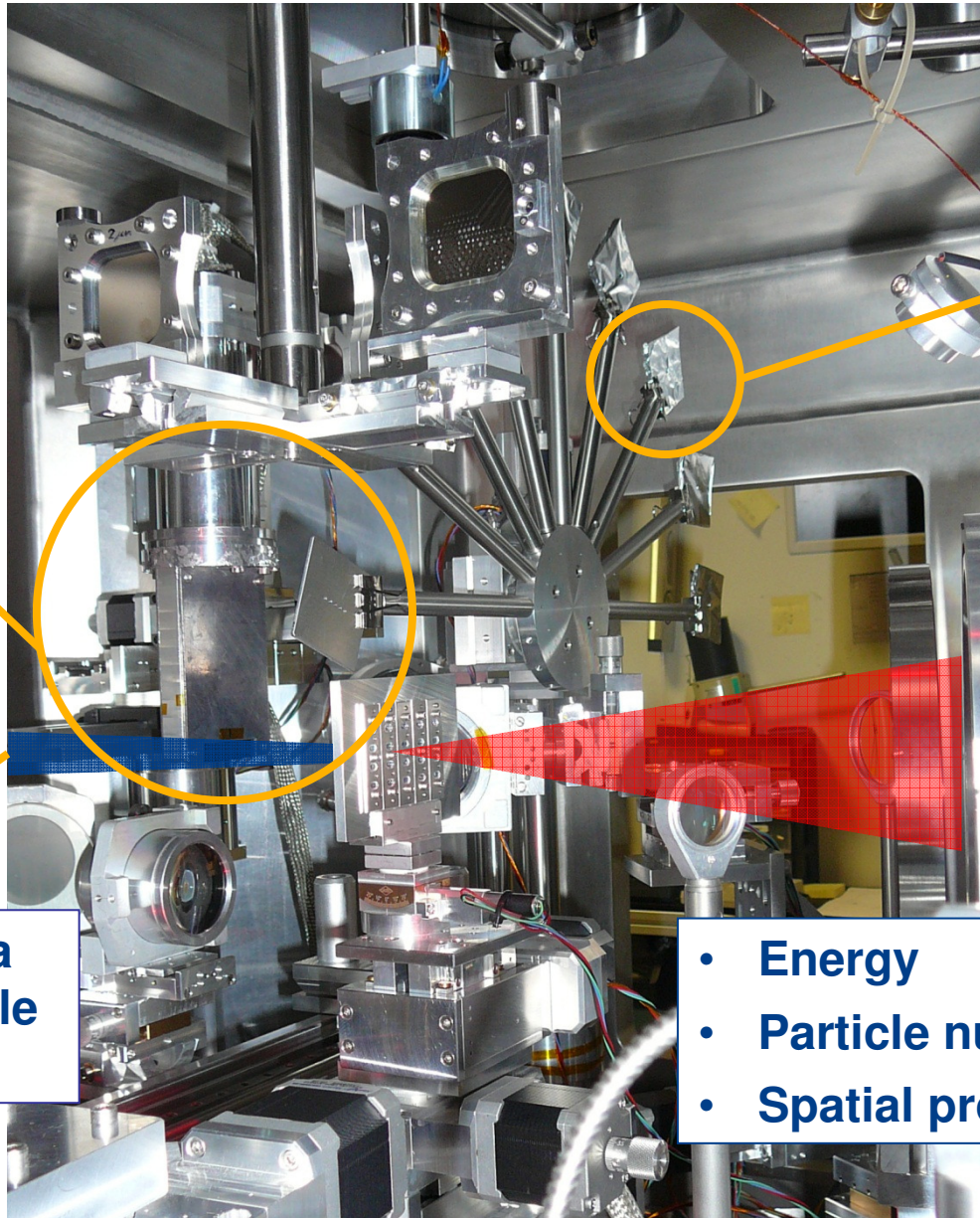


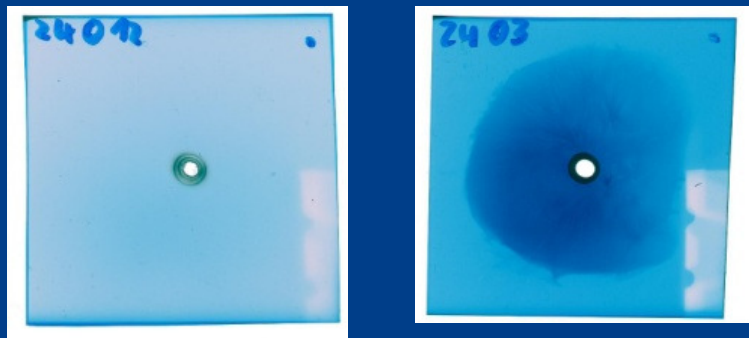
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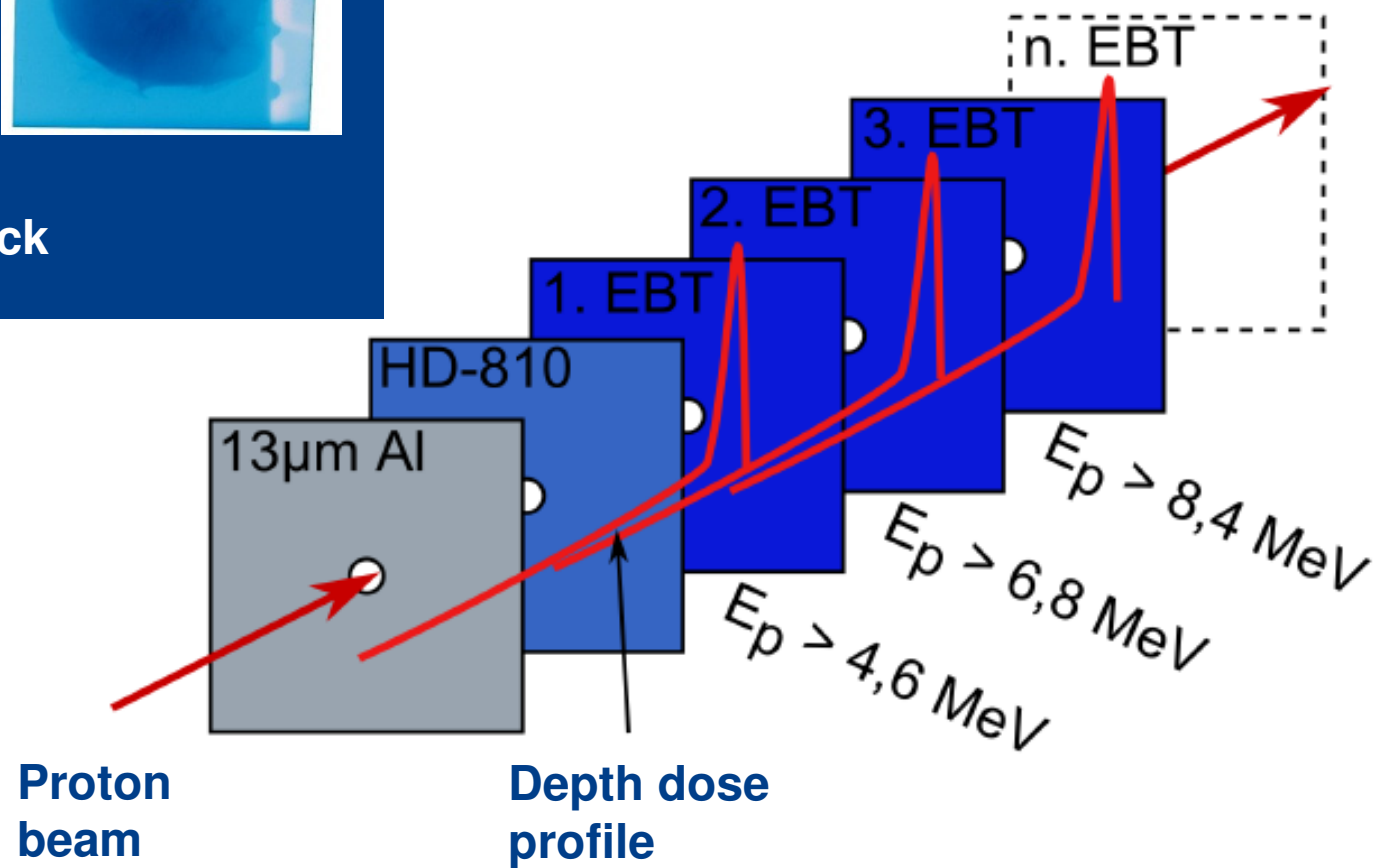
Thomson-Parabola
→small solide angle
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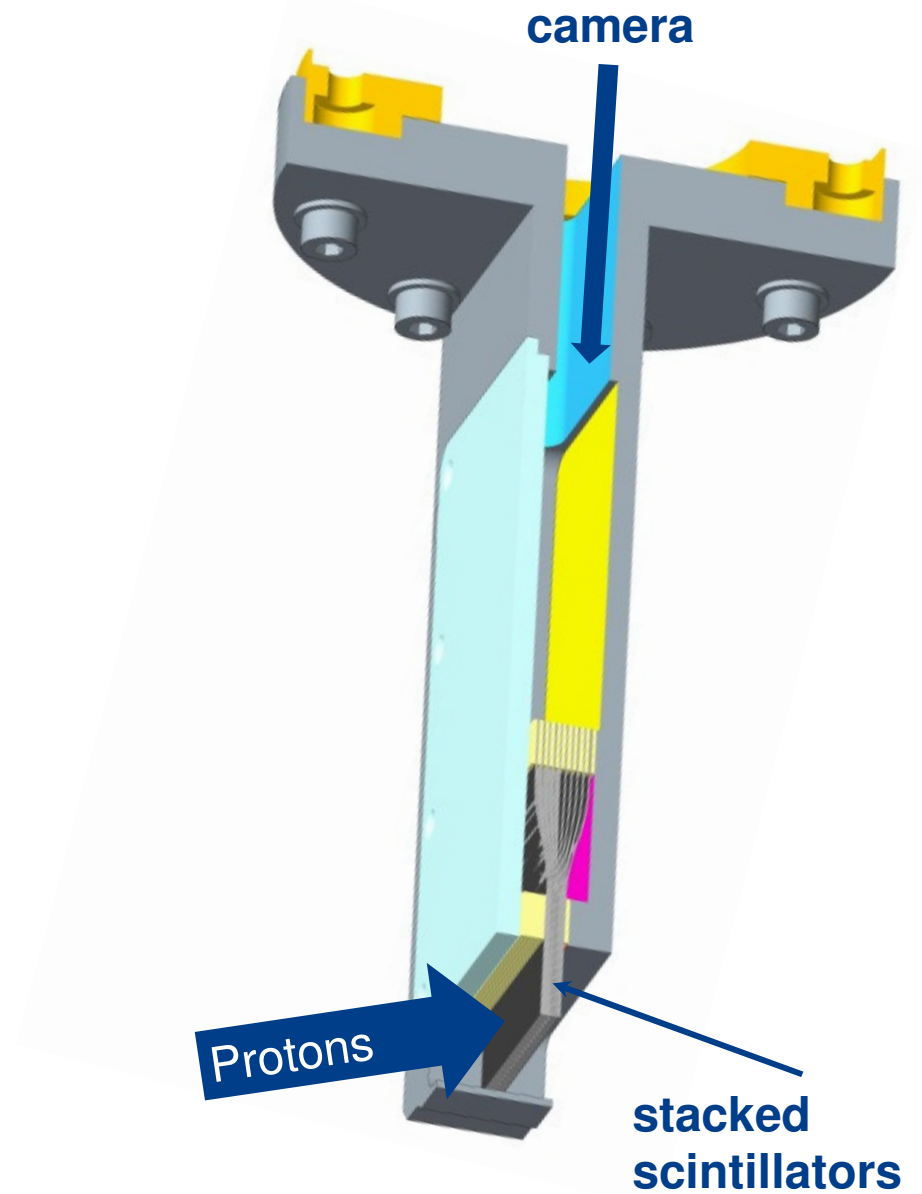
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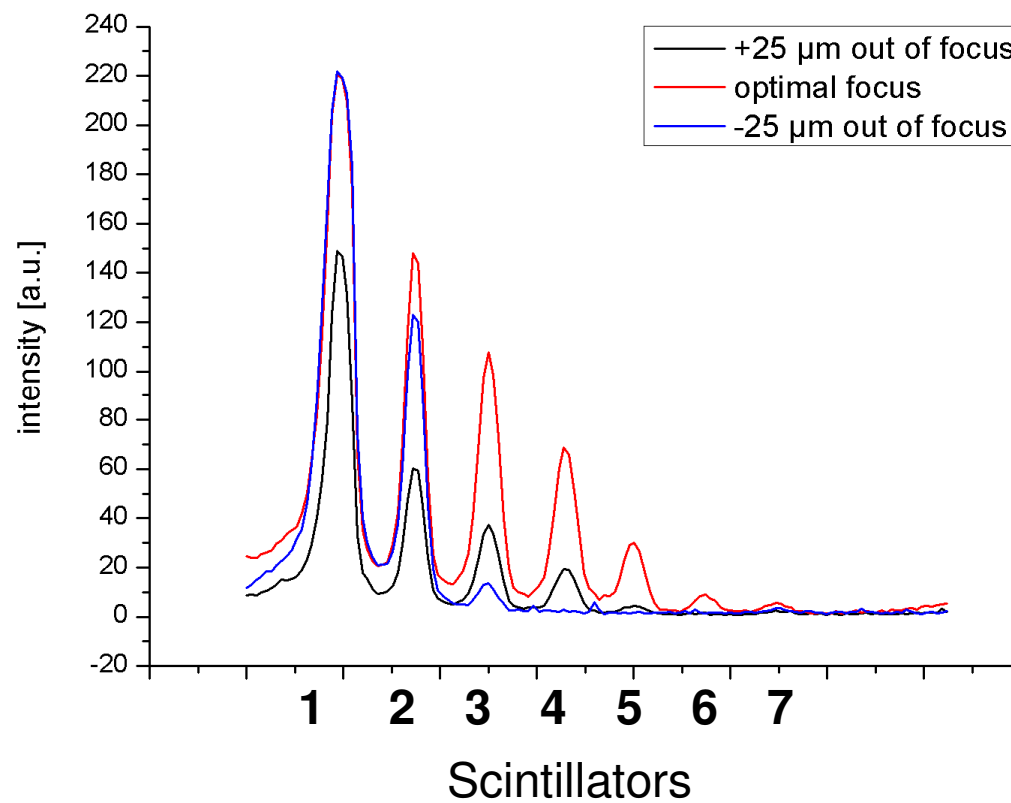
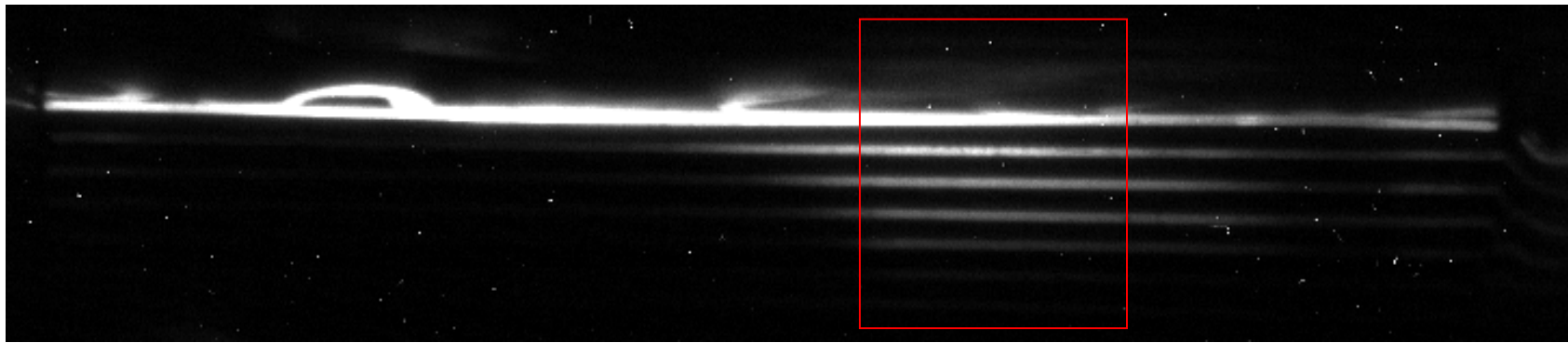




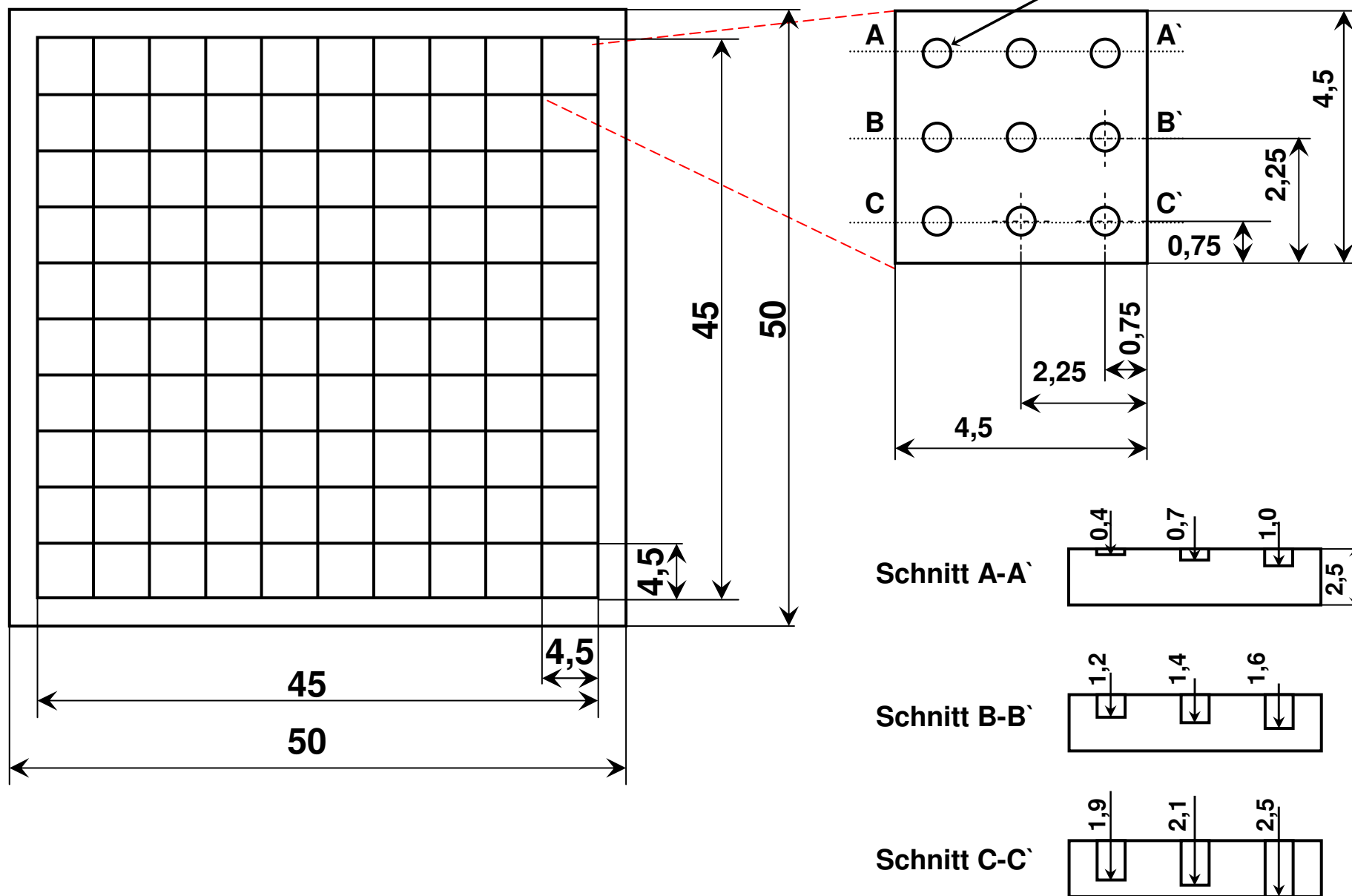
250 μm thick



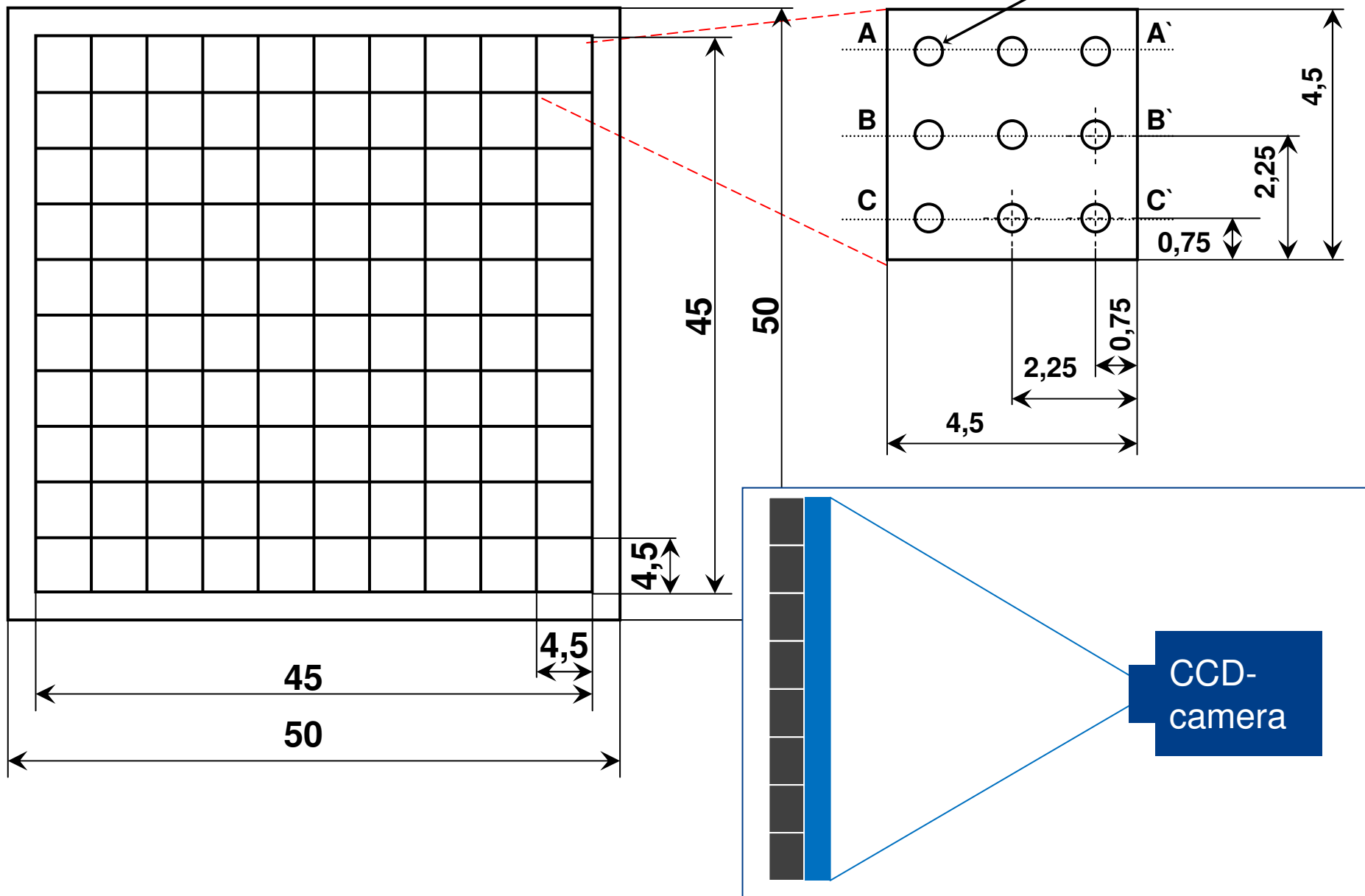




Outlook: 2 D pixel detector



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... thanks for your attention



*(multiple filamentation of freely
propagating 100 TW beam in air)*