

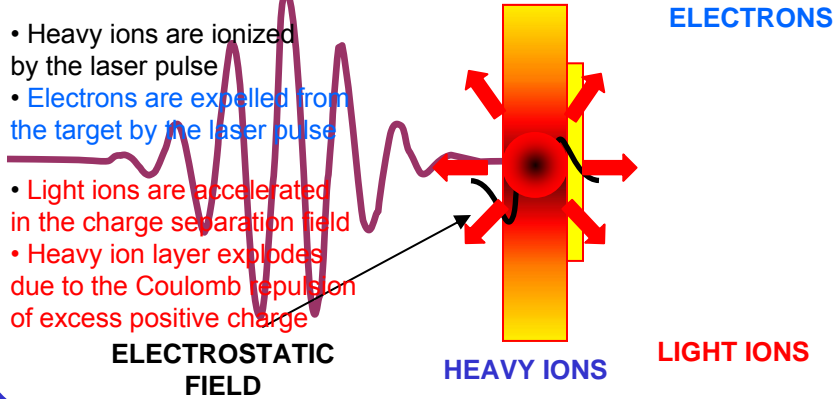
# Laser acceleration of monoenergetic protons from ultra-thin foils in the Directed Coulomb Explosion regime.

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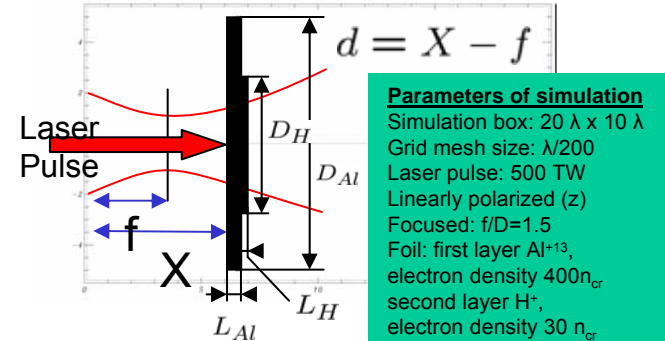
Coulomb Explosion of a double layer target (principal scheme - animation)

- Heavy ions are ionized by the laser pulse
- Electrons are expelled from the target by the laser pulse

- Light ions are accelerated in the charge separation field
- Heavy ion layer explodes due to the Coulomb repulsion of excess positive charge



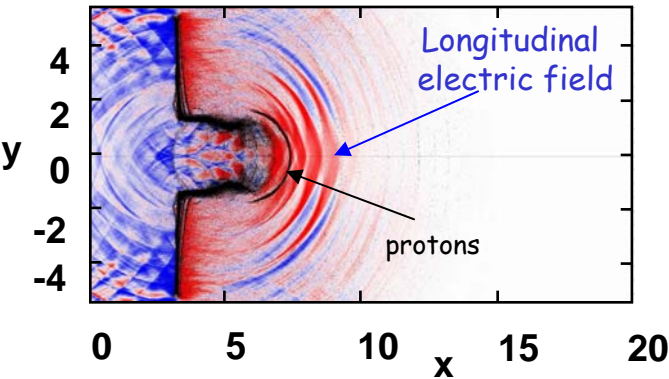
Scheme of interaction



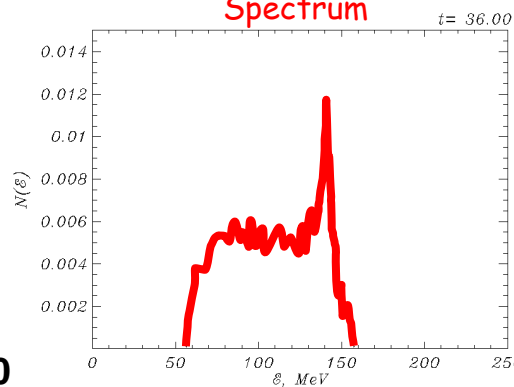
**Parameters of simulation**  
 Simulation box:  $20 \lambda \times 10 \lambda$   
 Grid mesh size:  $\lambda/200$   
 Laser pulse: 500 TW  
 Linearly polarized (z)  
 Focused:  $f/D=1.5$   
 Foil: first layer  $Al^{+13}$ , electron density  $400n_{cr}$   
 second layer  $H^+$ , electron density  $30 n_{cr}$

Directed Coulomb Explosion of a double layer target (2D particle-in-cell simulation results)

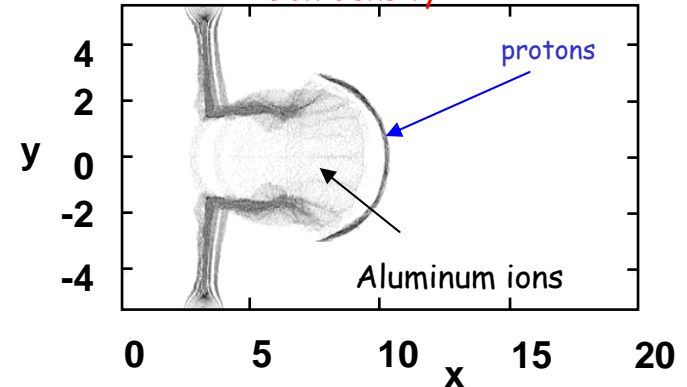
Accelerating Field



Spectrum



Ion density



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