Reduced model to accelerate the study of laser-electron scattering

Challenges with near-future experiments

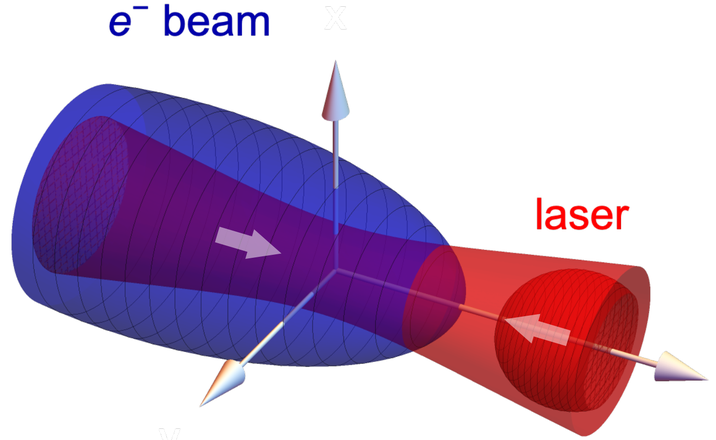
Near-future laser facilities will allow studies on electron-positron production from light

Experimental parameters may vary between shots

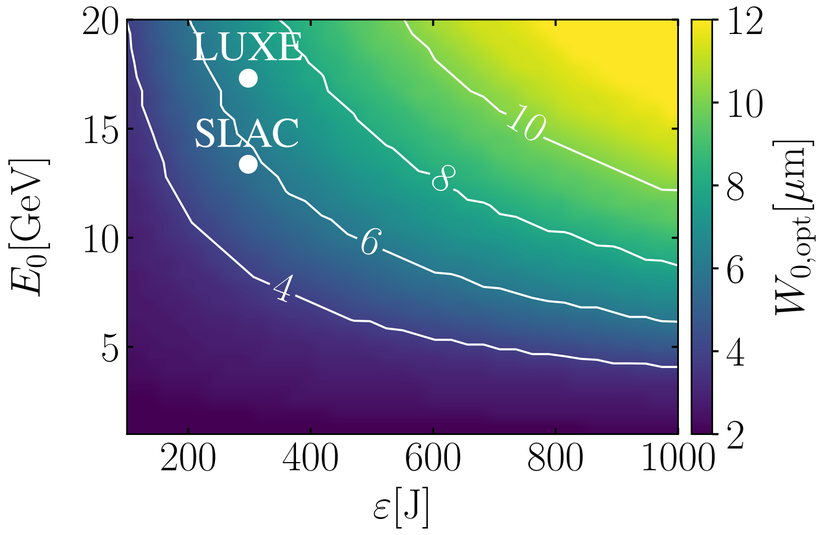
Simulations to support experiments requires $O(10^6)$ CPUh

Plane Wave models are not enough to model electron-laser scattering for focused laser pulses

Geometry of focused laser scattering



Optimal focusing parameters



Conclusions & Future work

Integrating the Plane Wave model over the $a_{0,\mathrm{eff}}$ distribution function gives the number of positrons produced in a focused laser

$$N_+ = \int N_+^{\mathrm{PW}}(a_{0,\mathrm{eff}}) \frac{\mathrm{d}N_b}{\mathrm{d}a_{0,\mathrm{eff}}} \mathrm{d}a_{0,\mathrm{eff}}$$

Our model can be run on a single CPU in a matter of minutes, thus reducing the required computational resources.

Paper: Óscar Amaro and Marija Vranic 2021 New J. Phys. **23** 115001