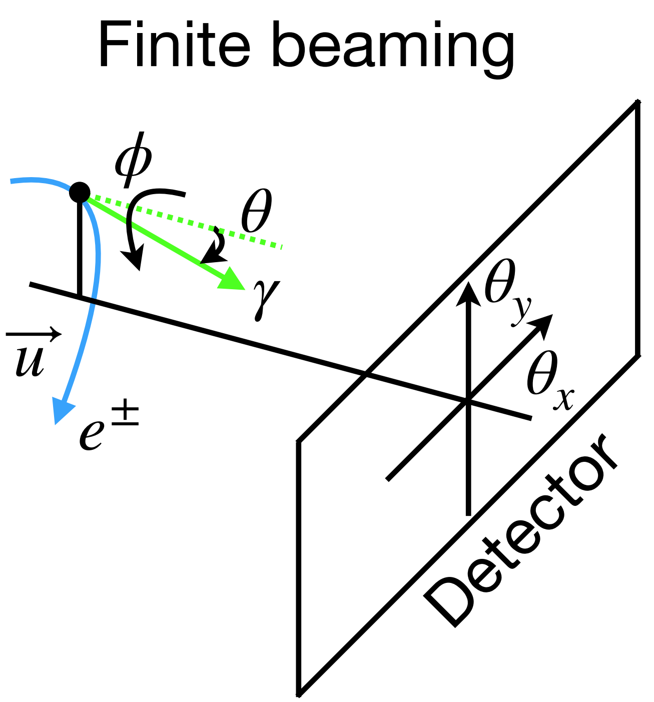
Blackburn2020a - Beaming

Blackburn *et al* showed that the transverse recoil caused by this finite beaming, while negligible in many high-intensity scenarios, can be identified in the increase in divergence, in the plane perpendicular to the laser polarization and wave vector, of a high-energy electron beam that interacts with a linearly polarized, ultraintense laser.



It only makes sense to sample in a domain $\theta \in [0, \sim 6/\gamma], \omega \in [0,\gamma[$.

Using rejection method to sample from this distribution has relatively low efficiency as the distribution is peaked near $\theta \sim 0$

The azimuthal angle takes values $\phi \in [0,2\pi[$ uniformly.

To obtain the detected angle, we need to add emitting to the emitted angle $\theta_x = \angle u_x + \theta\cos(\phi), \theta_y = \angle u_y + \theta\sin(\phi)$

$$W^{(3)}_{\chi,\gamma}(\theta,\omega) = \frac{\omega}{3\sqrt{3}\pi^2\gamma^2\chi} K_{1/3}\left(\frac{4\sqrt{2}\gamma^3\omega(1-\sqrt{1-1/\gamma^2}\cos\theta)^{3/2}}{3\chi(\gamma-\omega)}\right)\left(\omega+\gamma(2\omega^2+4\gamma^2-4\gamma\omega-1)-2\sqrt{\gamma^2-1}(2\gamma^2-2\gamma\omega+\omega^2)\cos\theta\right)$$

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