

We will describe the benefits of large recoil electron-photon collisions towards achieving large phase space density of secondary beams generated in the primary collision. Large recoils slow down the movement of center of mass system, so that the smaller associated Lorentz boost reflects in smaller emittance or smaller bandwidth of secondary beams (charged particle pairs or photons). Such a unique property of large recoil collisions can lead to new techniques for generating ultra-low emittance positrons or intrinsically mono-chromatic gamma rays (see C. Curatolo et al. Phys. Rev. Accel. and Beams 20, 080701 (2017)).