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Quantum Radiation-Reaction Trapping of an Electron-Positron Pair Plasma

We investigate the production and subsequent confinement of an electron-positron pair plasma when a laser pulse of ultra-relativistic intensity collides with a beam of incoherent gamma-rays. The secondary fermions tend to be confined when the radial ponderomotive force due to the laser intensity profile is balanced by the radiation damping (recoil) that they experience due to energetic photon emission. The particle-in-cell calculations are based on experimental conditions that may be realizable with a petawatt-class argon fluoride laser.

Working group

WG5 : Beam sources, monitoring and control

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