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Physics Model to Study Resonant Compton Scattering

Thursday 14 August 2025 16:00 (2 hours)

Over the past several decades, the elastic interaction between photons and electrons known as Compton scattering, has been the foundational mechanism for generating high-energy photon beams, particularly in the gamma-ray regime. Resonant interactions between photons and atomic systems offer significantly enhanced resonant cross-sections, often several orders of magnitude greater than what is achievable through conventional Compton scattering of electron and photon beams. The Gamma Factory initiative at CERN aims to exploit this enhancement by employing ultra-relativistic, partially stripped ion beams to generate high-intensity gamma-ray beams. In this work, we first examine the energy-matching requirements for resonance. We then present a semi-classical model based on a damped-driven oscillator to describe resonant Compton scattering. This model provides physical insight into the resonant cross-section and the limitations imposed by beam-beam interactions. We also propose a framework for simulating the scattering process.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

Yes

Footnotes

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I have read and accept the Privacy Policy Statement

Yes

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