



Contribution ID: 979 Contribution code: TUPL181

Type: **Poster Presentation**

## **Scattered spectra from inverse Compton sources operating at high laser fields and high electron energies**

*Tuesday, 9 May 2023 16:30 (2 hours)*

As Compton X-ray and gamma-ray sources become more prevalent, to understand their performance in a precise way it becomes important to be able to compute the distribution of scattered photons precisely. An ideal model would: (1) include the full Compton effect frequency relations between incident and scattered photons, (2) allow the field strength to be large enough that nonlinear effects are captured, and (3) incorporate the effects of electron beam emittance. Various authors have considered various pieces of this problem, but until now no analytical or numerical procedure is known to us that captures these three effects simultaneously. Here we present a model for spectrum calculations that does simultaneously cover these aspects. The model is compared to a published full quantum mechanical calculation and found to agree for a case where both full Compton effect and nonlinear field strength are present. We use this model to investigate chirping prescriptions to mitigate ponderomotive broadening.

### **Funding Agency**

National Science Foundation (USA)

### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

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**Session Classification:** Tuesday Poster Session

**Track Classification:** MC2: Photon Sources and Electron Accelerators: MC2.A23: Other Linac Based Photon Sources