Abstract Submitted
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Nonlinear Compton scattering from bound electrons[1] AKILESH VENKATESH, FRANCIS ROBICHEAUX, Purdue University, West Lafayette — A recent experiment by Fuchs et al.[2] of non-linear Compton scattering revealed an anomalous frequency shift of high-intensity X-rays by electrons in solid beryllium. This frequency shift was at least 800 eV to the red of the values predicted by analytical free-electron models for the same process. Here, we describe a theoretical method for simulating non-linear Compton scattering from bound electrons in a local spherical potential to explore the role of binding energy in the frequency shift of scattered Xrays.[3] The calculations do not reveal an additional redshift in the scattered Xrays beyond the nonlinear Compton shift predicted by the free-electron model. Two alternate causes for the anomalous redshift consisting of electron-electron correlation effects and a case of linear Compton scattering from a photoionized electron followed by electron recapture are examined and ruled out.

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[2]**Nat. Phys.** 11, 964 (2015)
[3]**Phys. Rev. A** 101, 013409 (2020)

Akilesh Venkatesh
Purdue University, West Lafayette

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