Abstract Submitted
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Recoil effects due to electron shake-off following the beta decay of ^{6}He[1] GORDON W.F. DRAKE, EVA SCHULHOFF, University of Windsor — There are currently several experiments in progress to search for new physics beyond the Standard Model by high precision studies of angular correlations in the β decay of the helium isotope ^{6}He to form $^6\mathrm{Li} + e^- + \bar{\nu}_e$ [1,2]. After the β decay process, the atomic electrons of $^6\mathrm{Li}^+$ adjust to the sudden change of nuclear charge from 2 to 3. We calculate the probabilities for electron shake-up and shake-off, including recoil effects, by the use of a Stieltjes imaging representation of the final states. A variety of sum rules provides tight consistency checks on the accuracy of the results. Results obtained previously [3] indicate that there is a 7σ disagreement between theory and experiment for the additional nuclear recoil induced by the emission of atomic shake-off electrons. This disagreement will be further studied, and the results extended to the $1s2p\ ^3P$ and metastable $1s2s\ ^3S$ states as initial states of ^{6}He before β-decay.

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[2] O. Naviliat-Cuncic and M. Gonzalez-Alonso, Ann. Phys. **525**, SI 600-619 (2013).
[3] Eva Schulhoff and G.W.F. Drake, Phys. Rev. A **92**, R050701 (2015).

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