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Computational Analysis of the Relative Decay Constants for ^{7}Be, ^{7}Be^{+}, and ^{7}Be^{++} MARK HUTCHISON, BRYAN PETERSON, Brigham Young University — The inverse beta decay rate of ^{7}Be fluctuates correspondingly to the electron affinities of neighboring host atoms. Recently, evidence has emerged showing a linear relationship between the decay rate and the fraction of 2s electrons still "present" in ^{7}Be after being inserted into a material [1]. This implies there is a correction needed in our Standard Solar Model; the current ^{8}B solar neutrino flux calculation uses the decay constant of ^{7}Be inserted into natural Be assuming it retains both 2s electrons. By using a low density non-neutral plasma consisting mostly of ionized ^{7}Be atoms to measure a decay rate we can (1) bypass interstitial effects from host atoms, (2) know the exact number of electrons in the atom, and (3) increase the accuracy of the charge density calculation using more rigorous computational methods that are currently limited to small systems. We will show different predictive calculation methods for the decay rate of ^{7}Be, ^{7}Be^{+}, & ^{7}Be^{++} in this type of environment and compare our current results to the above mentioned linear model.

[1] P. Das and A. Ray, Phys. Rev. C **71**, 025801 (2005).

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