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**Electron-like scattering of positronium with Helium** JOSEPH DI RIENZI, Notre Dame of Maryland University, RICHARD DRACHMAN, NASA/Goddard Space Flight Center — A recent work [1] established experimentally that positronium (Ps) scattering by various atoms is close in total cross-section to that of an isolated electron of the same velocity. This presumes that the e- in Ps moves very similar to a free e- scattering off an element such as He, and that the positron has little contribution. Most theoretical models of Ps scattering through He have considered the excitation of Ps the dominant effect. Yet, these do not show much difference in the scattering length from a static exchange formulation [2] even with many Ps states [3]. In this work we will examine two different models of Ps-He scattering. First, we look at electron exchange with some excited states of He using a variational method, and then at exchange with excited states of Ps. Finally, we compare the two scattering results determined to see if a target-inelastic model has a greater effect than a projectile-inelastic model.

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[2] P.A. Fraser and M. Kraidy. *Proc. Phys. Soc.*, 89, 533 (1966); M. Kraidy. private communication (1969).

[3] J.E. Blackwood, C. P. Campbell, M. T. McAlinden and H. R. J. Walters. *Phys. Rev. A*, 60, 4454 (1999).

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