

Abstract Submitted
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Exchange and correlations in Ps-atom and Ps-molecule scattering¹ ILYA FABRIKANT, University of Nebraska-Lincoln, ROBYN WILDE, Oregon Institute of Technology — Exchange and correlations play a particularly important role in positronium (Ps) collisions with atom and molecules, since the static potential for Ps interaction with a neutral system is zero. Theoretical description of both effects is a very challenging task. In the present work we use the free-electron-gas model to describe exchange and correlations in Ps collisions with molecules similar to the approach widely used in the theory of electron-molecule collisions [1,2]. The results for exchange and correlation energies are presented as functions of the Fermi momentum of the electron gas and the Ps incident energy. Using the Thomas-Fermi model, we can convert these functions into exchange and correlation potentials for Ps interaction with molecules as functions of the distance between the projectile and the target. These potentials are used then for calculation of cross sections for Ps collisions with N₂ molecules. ¹ S. Hara, J. Phys. Soc. Japan **22**, 710 (1967). ² J. K. O'Connell and N. F. Lane, Phys. Rev. A **27**, 1893 (1983).

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Ilya Fabrikant
University of Nebraska-Lincoln

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