

Abstract Submitted  
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**Density Matrices in the Quenching of Positronium by Electron Exchange** SUDHA SWAMINATHAN, WYATT MERRILL, STEPHEN GLYNN, JOSEPH QUATTRUCCI, Worcester State University — Electron exchange in a single collision between *ortho* positronium and a target with one unpaired electron can result in the conversion (quenching) of the long-lived *ortho* positronium into the short-lived *para* positronium. The probabilities of forming *para* and *ortho* positronium after the collision are calculated using angular-momentum coupling and density-matrix techniques. The fraction of the initial *ortho* positronium that is converted to *para* positronium (quenching fraction) is given in terms of complex scattering amplitudes labeled with total electron spin. Quenching fractions are obtained for polarized and unpolarized targets, with and without detection of the spin of the target after the collision.

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