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Generalized polarizabilities of Ps negative ion ANAND BHATIA, RICHARD DRACHMAN, NASA/Goddard Space Flight Center — The positronium negative ion, consisting of two electrons and a positron, is particle stable and decays only by e^+ and e^- annihilation into gamma rays. In the past, we have calculated various properties like ground state [^1S] energy, decay rate, and photodetachment cross sections. The latter could be used to generate positronium (Ps) beams of controlled energy by accelaration of the Ps negative ion and then photodetaching one of the electrons. A possible type of metastable excited state of the dipositronium molecule (Ps_2) has the form of a Ps^- and a positron in a Rydberg state. Although the modified Coulomb potential will account for most of the binding energy, for high L states the generalized polarizabilities [α_i, β_i, γ_i, i=1,2] will contribute small but significant energy shifts. We calculate these quantities by the pseudostate method. Ps^-, being a loosely bound system, has very large polarizabilities as compared to those of the hydrogen ion [H^-] and the helium atom.

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