

ORTHO-POSITRONIUM — ORTHO-POSITRONIUM SCATTERING AT LOW AND MEDIUM ENERGIES

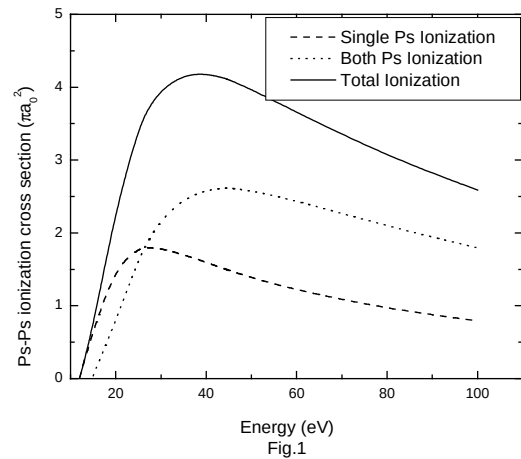
Sumana Chakraborty¹, Kiran Kumari², and A S Ghosh¹

1) Department of Theoretical Physics, Indian Association for the Cultivation of Science,
Jadavpur, Calcutta-700 032, India

2) Department of Physics, R N College, Hajipur (Vaishali), B R A Bihar University,
Muzaffarpur, Bihar, India

The interactions of many positrons and many positroniums are of topical interest for their application in different branches of Physics. Till date very few theoretical *ab initio* calculations on the scattering of positronium (Ps) atoms [1-4] have been carried out and all of them are restricted to s-wave only. The reason for this is the difficulty to evaluate exchange matrix elements, which are multidimensional and multicentered.

The motivation of the present article is to study o-Ps—o-Ps scattering and give estimate of elastic as well as inelastic cross sections at low and medium energies. We have employed plane wave model in which effect of exchange is included by antisymmetrizing the total wave function of the system. We report the integrated cross sections for (i) excitation of one of the Ps atoms (single excitation) (ii) simultaneous excitation of both the Ps atoms (double excitation) for $n=2$ and $n=3$. In addition to this we also report single and double ionization of Ps atoms. We have also performed the partial wave calculations for elastic and excitation processes. We notice a peculiar behaviour of partial wave cross sections. Only even values of partial wave survive for even parity transitions and vice versa. To the best of our knowledge this feature has not been noticed for other systems.



In fig. 1 we present single, double and total ionization cross sections from the threshold to 100 eV. It has been found that major contribution to the total cross sections arises from the double ionization processes. Detailed results will be submitted at the conference.

References

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