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Investigation of positronium formation by molecular hydrogen ion impact with multiple scattering formulation in charge transfer channel

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Abstract

In the present work the first and second order scattering amplitudes and the related phase were calculated in the charge transfer channel. The positronium formation, with the impact of molecular hydrogen ion, has been carried out using multiple channel scattering formulation and transition matrix. The calculation of differential cross section has been done by varying the scattering angle from 0 to 180 in the fixed orientation of the molecule. In the next calculation the scattering angles were fixed while the spatial molecular orientation was varied. At last the calculated differential cross section was compared with available results in the literature. The scattering angle spanned from 0 to 180 degrees in the second order nuclear and electronic terms were calculated while the molecular orientation was assumed to be fixed. Otherwise, the scattering angles were fixed in the calculation of the corresponding amplitudes while the orientation was varied. At last our calculations were compared with available results.

Keywords: molecular hydrogen ion, positronium, scattering amplitude, scattering angle

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