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ABSTRACTS

POSITRONIUM FORMATION BY SCATTERING OF POSITRONS BY ALKALI ATOMS

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We are calculating the total cross sections for the formation of positronium by the scattering of intermediate energy positrons (50eV to 200 eV) by various alkali atoms Li, Na and K. The alkali atoms in their ground state are approximated to a "model" hydrogen-like system by averaging over the alkali ion core using the Slater-type-orbitals. For the electron capture from the outermost shell of the alkali atoms by positrons into the ground state of the positronium, we are using the distorted wave Born approximation[1,2] for rearrangement collisions. All the relevant integrals are reduced into one- or two-dimensional forms which are evaluated numerically. The effects of polarization of the alkali target are partially taken into account via the Coulomb interaction of the positron with the "model" alkali atom. At the present moment, no experimental information regarding the positronium formation in alkali atoms is available. Our calculated cross sections for positronium formation in positron-alkali atom scattering in the intermediate energy range agree favorably with other available calculations.

1. H. Bassel and E. Gerjuoy, Phys. Rev. 117, 749 (1960).

2. Robin Shakeshaft and J.M. Wadehra, Phys. Rev. A 23, 968 (1980).