Abstract Submitted
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A simple approach to calculating positronium formation ALLAN STAUFFER, Department of Physics and Astronomy, York University, Toronto, Canada, ROBERT MCEACHRAN, CAMS, Research School of Physics and Engineering, Australian National University, Canberra, Australia — We have developed a simple method to calculate positronium formation in positron-atom scattering based on an idea first proposed by Reid and Wadehra [1]. We have applied it to positron scattering from neon, argon, krypton and xenon. Our method involves lowering the threshold for direct ionization, I, by 6.8 eV, the binding energy of positronium, and calculating the ionization cross section using our complex optical potential approach [2]. By subtracting the cross section for ionization calculated with the unmodified threshold for ionization we obtain the result for positronium formation. Since the positronium formation cross section goes to zero more rapidly than for direct ionization, we have taken this into account by linearly raising the threshold for ionization until it coincides with I for incident positron energies above 120 eV. We have found that our cross sections calculated this way are in better overall agreement with experimental measurements than more elaborate theoretical calculations.

[1] D.D. Reid and J.M. Wadehra 1996 J. Phys. B 29 L127
[2] R.P. McEachran and A.D. Stauffer 2013 J. Phys. B 46 03

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