Ring Vortices for Positronium Formation in Positron-Hydrogen Collisions in the Ore Gap[1] S. J. WARD, ALBANDARI W. ALROWAILY[2], Univ of North Texas, P. VAN REETH, University College London — Using the inverse Kohn variational method, we determine K-matrices, the Ps-formation scattering amplitude f_{Ps}, and the corresponding differential cross section (DCS) for positron-hydrogen collisions in the Ore gap (6.8 to 10.2 eV) [1]. We also determine the velocity field associated with f_{Ps} [1]. There are two zeros in f_{Ps} and the Ps-formation DCS for when these quantities are functions of the magnitude of the momentum of the incident positron, $\mathbf{k}$, and the scattering angle of the outgoing Ps. Associated with each zero in f_{Ps}, there is a ring vortex. By making a linear expansion of f_{Ps} about the vicinity of a zero, we determine for each zero the expectation value of the y-component of the angular momentum, $\langle L_y \rangle$, over a small area (circle or square) in the vicinity of the zero, where the z-axis is the direction of $\mathbf{k}$ and the x-axis is in the plane of $\mathbf{k}$ and the momentum of the outgoing Ps.

[1] A. W. Alrowaily, S. J. Ward, P. Van Reeth, in preparation.

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