Hyperspherical hidden crossing calculation of Ps formation in low-energy $e^+\text{-}Na$ collisions

S.J. WARD, University of North Texas, J. SHERTZER, College of the Holy Cross — The hyperspherical hidden crossing method (HHCM) can provide important insight into scattering processes. Previously, we have used the HHCM to calculate the Ps(1s)-formation cross section in low-energy $e^+\text{-}H$ [1] and $e^+\text{-}Li$ [2] collisions. Here we apply the HHCM to low-energy $e^+\text{-}Na$ collisions. We use the Peach model potential and treat $e^+e^-\text{Na}^+$ as an effective three-body system. We calculate the Ps(1s)-formation cross sections for $0 \leq L \leq 3$ and compare our results with a hyperspherical close-coupling calculation [3]. The HHCM provides an explanation for the small S-wave Ps(1s)-formation cross section. The S-wave Stückelberg phase is close to $\pi$ for the three collision systems due to destructive interference between the two amplitudes that correspond to different paths leading to Ps(1s) formation.