**Near-threshold Ps(n=2)-p scattering**[1] ILYA FABRIKANT, Univ of Nebraska - Lincoln, IGOR BRAY, Curtin University Perth — We study the threshold behavior of elastic and inelastic collisions of the excited positronium (Ps) atom with the proton using the theory developed by Gailitis [J. Phys. B **15**, 3423 (1982)]. We show that partial cross sections for elastic and quasielastic processes exhibit pronounced oscillations above the threshold and diverge as $1/E$ where $E$ is the collision energy. This behavior is limited from below by the energy equal to the relativistic splitting between degenerate Ps states. *Ab initio* close coupling calculations are in excellent agreement with the results of the threshold theory. The oscillations almost completely disappear in the total (summed over partial waves) cross sections. However, dipole-supported resonances appear in inelastic processes, in particular in the important process $Ps(nl) + p \rightarrow H(n'l') + e^+$ below higher-energy thresholds. Above thresholds these cross sections don't exhibit oscillations but have the $1/E$ divergence in an exothermic case. These results are important for current attempts to produce antihydrogen in a similar charge-conjugated reaction $Ps(nl) + \bar{p} \rightarrow \bar{H}(n'l') + e^-$.

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