A DECADE-OLD MYSTERY DECODED: THE ENERGY-SHARING ASYMMETRY IN IONIZATION BY POSITRON IMPACT

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One decade ago, an experimental study [1] of the positron impact ionization on H_2 showed the occurrence of a capture-to-the-continuum cusp, a well-known phenomenon in ion-atom ionization collisions that had been predicted also for positrons over a decade earlier [2]. This study also unveiled a very surprising result, an unexpected strong asymmetry where the electrons got much less energy than the positrons in the final state. Further coincidental measurements of the electron and positron energy and angle distributions in a collinear geometry confirmed this early finding [3,4] This phenomenon was far more intense than in ion-atom collisions, and had been unforeseen by quantum mechanical theories [5,6], even though a latter classical trajectory Monte-Carlo (CTMC) calculation seemed to corroborate it [7]. Since then, different explanations had been tried out, as for instance a competition with Ps formation [4] and annhilation [8] channels. In this communication we propose a different mechanism based on a dynamical orientation of the electron-positron continuum dimmer. The corresponding calculations are shown to be in full agreement with the available experimental and CTMC results. Finally, a suitable method to experimentally corroborate this assertion is presented.

This work was partially supported by Agencia Nacional de Promoción Científica y Tecnológica (Grants 03-12567 and 03-20548), Consejo Nacional de Investigaciones Científicas y Técnicas (Grant PIP 5595) and Universidad Nacional de Cuyo (Grant 06/C229). The authors are also members of the Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina.

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Researchers at Pacific Northwest National Laboratory (PNNL) have solved a mystery for a chemical reaction essential for fuel and fertilizer production. The so-called water-gas shift reaction forms hydrogen fuel and carbon dioxide from carbon monoxide and steam.Â Team solves decade-old mystery in chemical transformations. by Genoa Blankenship, Environmental Molecular Sciences Laboratory. Ferris wheel depicts the carboxyl catalytic cycle. Credit: Cortland Johnson. Researchers at Pacific Northwest National Laboratory (PNNL) have solved a mystery for a chemical reaction essential for fuel and fertilizer production. The so-called water-gas shift reaction forms hydrogen fuel and carbon dioxide from carbon monoxide and steam. Ionization cross-sections for positron collisions with N2. The European Physical Journal D, Vol. 68, Issue. 3Â In this chapter, we consider experimental methods employed to investigate positron and positronium impact ionization and fragmentation in collision with atoms and molecules, and associated results. In the case of positrons, an extensive database now exists of integral cross sections for the inert atoms (see, e.g., [5]), less so for molecules (see, e.g., [6]); differential data remain sparse (e.g., [5]). Our focus will be on the latter two topics as well as studies with positronium projectiles. Related content.Â Photons emission and charge-exchange contributions to the energy loss of swift heavy ions in dense matter. By decoding this mystery, the researchers are helping unlock batteries with greater energy capacity. That could mean smaller, more powerful batteries able to rapidly deliver charges for everything from smartphones to electric vehicles.Â University of Texas at Austin. "Decades-old mystery of lithium-ion battery storage solved." ScienceDaily. ScienceDaily, 2 September 2020. . University of Texas at Austin. (2020, September 2). Decades-old mystery of lithium-ion battery storage solved. ScienceDaily.Â ScienceDaily shares links with sites in the TrendMD network and earns revenue from third-party advertisers, where indicated. Print Email Share. advertisement.