

Abstract Submitted  
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**Positronium formation in the forward direction in positron- $C_{60}$  collisions**<sup>1</sup> PAUL-ANTOINE HERVIEUX, Universite de Strasbourg, CNRS, Institut de Physique et Chimie des Materiaux de Strasbourg, France, HIMADRI CHAKRABORTY, Northwest Missouri State University, Maryville, USA — Following the impact of positrons with matter the formation of exotic electron-positron bound-pair, the positronium (Ps), is a vital process in nature. Varieties of target systems from atoms to smaller molecules to condensed matters have been accessed by the Ps formation spectroscopy. However, clusters and fullerenes in gas-phase have largely been one uncharted target territories until the calculations recently reported by us [1,2]. To further motivate applications of this spectroscopy to fullerene targets and to access target-level- as well as Ps-level-differential measurements, we now compute Ps formation cross sections in the forward collision direction within a very narrow angular range which is likely measurable by the existing technologies. The electronic structure of a  $C_{60}$  molecule is described by the local-density approximation with LB94 exchange-correlation functional [3]. The positron impact on  $C_{60}$  leading to the Ps formation is treated by the continuum distorted-wave-final-state approximation [4]. Comparisons with the angle-integrated result reveal more prominent diffraction resonances in the forward angle signal. [1] Hervieux et al., Phys. Rev. A **95**, 020701 (R) (2017); [2] Chakraborty et al., J. Phys.: Conf. Series **875**, 072002 (2017); [3] Choi et al., Phys. Rev. A **95**, 023404 (2017); [4] Fojon et al., Phys. Rev. A **54**, 4923 (1996).

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