

Abstract Submitted
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Two-center interference effects in (e, 2e) ionization of H₂ and CO₂ at large momentum transfer¹ MASAKAZU YAMAZAKI, ISAO NAKAJIMA, HIRONORI SATOH, NOBORU WATANABE, IMRAM, Tohoku University, Japan, DARRYL JONES, Flinders University, Australia, MASAHIKO TAKAHASHI, IMRAM, Tohoku University, Japan — In recent years, there has been considerable interest in understanding quantum mechanical interference effects in molecular ionization. Since this interference appears as a consequence of coherent electron emission from the different molecular centers, it should depend strongly on the nature of the ionized molecular orbital. Such molecular orbital patterns can be investigated by means of binary (e, 2e) spectroscopy, which is a kinematically-complete electron-impact ionization experiment performed under the high-energy Bethe ridge conditions [1]. In this study, two-center interference effects in the (e, 2e) cross sections of H₂ [2] and CO₂ at large momentum transfer are demonstrated with a high-statistics experiment, in order to elucidate the relationship between molecular orbital patterns and the interference structure. It is shown that the two-center interference is highly sensitive to the phase, spatial pattern, symmetry of constituent atomic orbital, and chemical bonding nature of the molecular orbital.

[1] M. Takahashi, Bull. Chem. Soc. Jpn. **82**, 751 (2009).

[2] M. Yamazaki *et al.*, Phys. Rev. A **90**, 052711 (2014).

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