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Fully Differential Cross Sections for Ionization of H_2 by 75 keV Proton Impact[1] JASON ALEXANDER, AARON LAFORGE, MICHAEL SCHULZ, ZAAL MACHAVARIANI, RYAN HUPE, UTTAM CHOWDHURY, DON MADISON, Missouri University of Science & Technology, MARCELO CIAPPINA, MPI Dresden — We have performed fully differential experimental and theoretical studies of single ionization of H_2 by 75 keV proton impact. In the scattering angle dependence of the measured cross sections for fixed electron energies pronounced structures were observed at relatively large angles. These structures are interpreted as an interference resulting from the two-center potential of the molecule. In our theoretical calculations such structures are only found if the interaction between the projectile and the nuclei of the molecule is incorporated. This suggests that the interference pattern originates mostly from indistinguishable diffraction of the projectile wave from the two centers rather than from the ejected electron wave. Furthermore, we found that the interference pattern is consistent with ionization being most likely for an orientation of the molecular axis perpendicular to the projectile beam axis at small scattering angles and parallel to the projectile beam axis at large angles. However, the preferred molecular orientation does not depend sensitively on the ejected electron energy, which may explain that the observed structures are more pronounced in the scattering angle dependence than in the electron energy dependence.

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