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Double-Slit Interference of Correlated Photoelectrons from Hydrogen Molecules K. KREIDI, R. DOERNER, T. JAHNKE, O. JAGUTSKI, H. SCHMIDT-BOECKING, U. Frankfurt, TH. WEBER, T. OSIPOV, M. H. PRIOR, Lawrence Berkeley Nat. Lab., A. KHEIFETS, Australian Nat. U., A. LANDERS, Auburn U., C.L. COCKE, Kansas State U. — We have studied the influence of the alignment and inter-nuclear separation on the electron emission from a hydrogen molecule following the absorption of a single, circularly polarized 240 eV photon. Using the COLTRIMS technique, we obtained fully differential cross sections for the double photo ionization for fixed-in-space molecular orientations by measuring the momenta of the two protons and one electron in coincidence. The measurements cover 4π solid angle. The body-fixed electron angular distributions include the effects of diffraction, symmetry, selection rules and the molecular orientation. The patterns show, for the first time, a kind of Young's double slit interference of a correlated electron pair inside a hydrogen molecule. The distributions have a distinct and unexpected dependency on the energy sharing between the two electrons, the molecular orientation and the kinetic energy of the two protons. The experimental results are compared with quantum mechanical calculations. This work is supported by: the Deutsche Forschungsgemeinschaft, and the BMBF (Germany) and by the Chemical Sciences, Geoscience and Biosciences Div., Office of Basic Energy Sciences, Office of Science, USDOE

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