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Complexity in the ionization dynamic of Helium dimers M.S. SCHÖFFLER, Lawrence Berkeley National Laboratory, Berkeley California 94720, USA, J. TITZE, H.-K. KIM, R.E. GRISENTI, N. NEUMANN, L. PH. H. SCHMIDT, O. JAGUTZKI, H. SCHMIDT-BÖCKING, R. DÖRNER, Institut für Kernphysik, Goethe Universität, Max-von-Laue-Straße 1, 60438 Frankfurt, Germany
— Helium dimers (He_2) are a Van-der-Waals bound system and the most extreme quantum matter in AMO physics with a binding energy below 0.1 μeV (1.1 mK). Its internuclear distance varies from 2 to several hundreds Angstrom (larger than a C60 fullerene). Their existence was predicted theoretically by Slater in 1928 and the experimental prove followed 1994 by Schöllkopf in a diffraction experiment. Single and double charged projectiles with energies of 25 - 150 keV/u were used to fragment the Helium dimer into two He^+-ions. Using the COLTRIMS (COLd Target Recoil Ion Momentum Spectroscopy) imaging technique we measured the three dimensional momentum vector of all fragments (He^+-ions and emitted electrons). We found different fragmentation/decay mechanisms, one involving the inter atomic coulombic decay (ICD).

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