Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Laser-kick induced helium dimer dynamics—a two-body interferometer[1] QINGZE GUAN, DOERTE BLUME, Homer L. Dodge Department of Physics and Astronomy, The University of Oklahoma, 440 West Brooks Street, Norman, Oklahoma 73019, USA, MAKSIM KUNITSKI, HOLGER MASCHKIWITZ, JÖRG HAHNENBRUCH, SEBASTIAN ECKART, STEFAN ZELLER, Institut für Kernphysik, Goethe-Universität Frankfurt am Main, Max-von-Laue-Straße 1, 60438 Frankfurt am Main, Germany, ANTON KALININ, GSI-Helmholtzzentrum für Schwerionenforschung, 64291 Darmstadt, Germany, MARKUS SCHÖFFLER, LOTHAR PH. H. SCHMIDT, TILL JAHNKE, REINHARD DÖRNER, Institut für Kernphysik, Goethe-Universität Frankfurt am Main, Max-von-Laue-Straße 1, 60438 Frankfurt am Main, Germany — The ^{4}He-dimer, one of the most weakly bound molecules in nature, gets gently kicked by a short intense laser pulse. This laser-kick, which is most prominently felt at small internuclear separations, induces both rotation and dissociation of the helium dimer. Due to the interplay between the bound and the dissociative portions of the wave packet, dynamical interference patterns in the alignment signal are observed experimentally. Our parameter-free theory results are in excellent agreement with the experimental results. The dynamics, which sensitively depends on the length of the laser pulse, is proposed to be used to probe the tunability of the helium-helium interaction by an external electric field. Our results are expected to guide the next generation of experiments

[1]Support by NSF is acknowledged.

Qingze Guan
University of Oklahoma

Date submitted: 01 Feb 2019 Electronic form version 1.4