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Direct Single-Photon Double Photoionization of NH_3 at 61.54eV Investigated Using Coincidence 3-D Momentum Imaging. THORSTEN WEBER, KIRK A. LARSEN, SAIJOSCHA HECK, AVERELL GATTON, WAEL ISKANDAR, ELIO G. CHAMPENOIS, Lawrence Berkeley National Laboratory, RICHARD STROM, Auburn University, TRAVIS SEVERT, BETHANY JOCHIM, ITZIK BEN-ITZHAK, Kansas State University, DYLAN REEDY, JOSHUA B. WILLIAMS, University of Nevada, Reno, ZACHARY STREETER, C. WILLIAM MCCURDY, University of California, Davis, ROBERT R. LUCCHESE, THOMAS N. RESCIGNO, DANIEL S. SLAUGHTER, Lawrence Berkeley National Laboratory
— We present state-selective measurements on various $H^+ + H^+$ dissociation channels in neutral NH_3 following direct single-photon double photoionization (DPI) at 61.54eV. Here, the two photoelectrons and two protons are measured in coincidence using 3-D momentum imaging, providing insight into the details of the electron and nuclear dynamics that ensue following direct single-photon DPI. Results indicate that four dication electronic states contribute to $H^+ + H^+$ dissociation. Three of these states result in equal energy sharing between the two protons, while the fourth results in unequal energy sharing between the two protons. Molecular plane proton momentum distributions suggest the three former states dissociate in a single step, while the later state fragments in multiple steps. Complementary photoelectron momentum distributions and singly differential cross sections for these states provide information on the mechanisms and energetics involved in the direct single-photon DPI process.

Kirk Larsen
Univ of California - Berkeley

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