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Mutual neutralization at low collision energies: the power of imaging[1] APRIL K. VASSANTACHART, SHALYNN L. ROMANO, MERL F. MARTIN, VOLA M. ANDRIANARIJAONA, Department of Physics, Pacific Union College, Angwin, CA 94508, USA, AODH O'CONNOR, Max-Planck-Institut fuer Kernphysik, D-69117 Heidelberg, Germany, XAVIER URBAIN, Institute of Condensed Matter and Nanosciences, Université Catholique de Louvain, Chemin du Cyclotron 2, 1348 Louvain-la-Neuve, Belgium — Mutual neutralization studies are generally limited to energies above a few eV, and do not specify the electronic state of the products, merely indicating a band of principal quantum numbers based on time-of-flight intervals (Terao *et al.*, Europhys. Lett. **1** (1986) 123). We upgraded our merged beam set-up to reach meV collision energies, and incorporated three-dimensional product imaging. Besides providing clear coincidence signals, this technique gives unambiguous identification of the electronic states of the products. Knowing their angular distribution at the different collision energies allows absolute cross sections to be retrieved. Results for the H^+/H^- and He^+/H^- systems will be presented, providing detailed branching ratios for non-degenerate channels.

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