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Kinematically Complete Experiments on Single Ionization in Simple Atomic Systems¹

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Fully differential studies on atomic reaction dynamics are crucially important to advance our understanding of the few-body problem. In the case of electron impact, fully differential cross sections for single ionization have been measured for several decades. The vast majority of these studies were restricted to electrons ejected into specific planes. More importantly, for ion impact such experiments are much more challenging and fully differential cross sections (FDCS) became only available a few years ago. However, at the same time these measurements for ion impact also yielded the first complete three-dimensional images of the FDCS. The sobering conclusion of these studies was that our understanding of ionization processes in atomic collisions is much less complete than assumed previously. In this talk new unexpected results on three-dimensional FDCS will be presented for kinematic regimes for which so far no experimental FDCS have been obtained yet. These include collisions involving highly relativistic and highly charged ions as well as relatively slow p projectiles.

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