Simultaneous ionization-excitation of helium to the 3s, 3p, and 3d states of He^{+1} OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University — We extended our work on ionization of helium with simultaneous excitation to the $n = 2$ states [1,2] to include the $n = 3$ manifold of the residual ion. This requires the inclusion of pseudo-states constructed on the 3s, 3p, and 3d ionic core. We used a parallelized version of the B-spline R-matrix (BSR) package [3] to perform a calculation with 1,254 target states, resulting in up to 3,027 coupled channels and matrices of rank up to 200,000 to be diagonalized. The triple-differential cross section (TDCS) was extracted by the projection method [1,4]. We obtain excellent agreement with experiment [5,6] regarding the angular dependence of the TDCS for all kinematical situations available for comparison. Some discrepancies remain for the absolute magnitude. Results for the $n = 2$ states are stable and closely agree with previous predictions [1,2].

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