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Partial Wave Contributions in Oriented Collisions¹ A L HARRIS, Illinois State University, S AMAMI, Missouri University of Science and Technology, T A SAXTON, Illinois State University, D H MADISON, Missouri University of Science and Technology — We present fully differential cross sections (FDCS) for two collision processes with oriented atoms. The first collision is electron-impact ionization of oriented Mg (3p), and the second collision is electron-impact excitation-ionization of helium with an oriented final state $\text{He}^+(2p0)$ ion. Surprisingly, the theoretical functional form of the FDCS is the same for both processes, despite the fact that the only physical similarity is an oriented excited state in both processes. We use the common theoretical functional form to explore possible physical similarities between the two processes. The contributions to the FDCS of individual partial waves of the ionized electron and projectile are examined, and we show that for the ionization of oriented Mg, the FDCS are dominated by larger partial waves of the ejected electron. For the excitation-ionization process, the FDCS is dominated by the $L = 2$ partial wave.

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