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Differential scattering of cold molecules in external electric and magnetic fields TIMUR TSCHERBUL, ROMAN KREMS, Department of Chemistry, University of British Columbia, Vancouver, B.C. V6T 1Z1, Canada — Previous work has shown that integral cross sections for molecular collisions at low temperatures can be controlled by external electromagnetic fields [1]. Here, we demonstrate that the differential scattering cross sections (DCS) may also be sensitive to external fields. The DCS is a coherent superposition of different partial wave (ℓ) contributions. Electric fields mix different rotational states, which leads to an indirect coupling of states with different ℓ , and modifies the angular dependence of the DCS. We show that the DCS for spin depolarization in CaH($^2\Sigma$)–He collisions can be shifted from sideways-peaked (in the absence of an electric field) to forward-peaked (at electric fields of ~ 100 kV/cm). This can be used to obtain valuable information about the anisotropy of intermolecular interactions [2], design experiments for kinematic slowing of molecules via inelastic collisions [1], and explore the stereodynamics of molecular collisions and chemical reactions [3]. References: [1] R. V. Krems, *Int. Rev. Phys. Chem.* **24**, 99 (2005); [2] U. Buck, *Rev. Mod. Phys.* **46**, 369 (1974); [3] D. Herschbach, *Eur. Phys. J. D* **38**, 3 (2006).

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