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Spin-orbit interaction and large inelastic rates in bismuth-helium collisions STEPHEN MAXWELL, MATTHEW HUMMON, YIHUA WANG, Harvard University Physics Department, ALEXEI BUCHACHENKO, University of British Columbia/Moscow State University Departments of Chemistry, ROMAN KREMS, University of British Columbia Department of Chemistry, JOHN DOYLE, Harvard University Physics Department — We present a combined experimental and theoretical study of cold collisions between bismuth and helium atoms in strong magnetic fields and demonstrate that measurements of collision-induced Zeeman relaxation provide a probe of the spin-orbit interaction couplings between different non- relativistic states of Bi. The Zeeman relaxation of Bi in the ground electronic state is found to be very efficient due to admixture of the electronic excited states and the electronic interaction anisotropy arising from the orbital angular momentum of the electrons in the excited states.

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