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Calculation of spin-orbit, static polarizabilities, and alignment of cold polar molecules OLIVIER DULIEU, MIREILLE AYMAR, Laboratoire Aime Cotton, CNRS, Univ Paris-Sud Orsay, France, JOHANNES DEIGLMAYR, ROLAND WESTER, MATTHIAS WEIDEMÜLLER, Albert-Ludwigs-University Freiburg, Germany — Cold polar molecules offer exciting perspectives for studying strongly interacting cold quantum gases. Their creation in the absolute ground state through successive absorption/emission sequences relies on the detailed knowledge of their structure. Here we present new calculations of the electronic structure of all heteronuclear alkali molecules, based on effective core and polarization potentials [1] and quasi-diabatic perturbation theory [2]. Results on static dipolar polarizabilities and spin-orbit coupling functions are obtained for all pairs, all symmetries, and all internuclear distances, for the first time in most cases. Prospects for the alignment and orientation of these molecules under the influence of a combined strong laser field and a weak electrostatic field [3] are discussed. [1] M. Aymar and O. Dulieu, J. Chem. Phys. 122, 204302 (2005) [2] R. Cimiraglia et al, J. Phys. B: At. Mol. Phys. 18, 3073 (1985) [3] B. Friedrich et D. Herschbach, J. Phys. Chem. A 103, 10280 (1999)

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