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Theoretical method to study electron-impact rotational excitation of neutral molecules[1] JASMEET SINGH[2], MARJAN KHAMESIAN, VIATCHESLAV KOKOOULINE, Department of Physics, University of Central Florida, Orlando, FL-32816, USA — A general theoretical approach to study rotational excitation in collisions of an electron with a neutral molecule is developed [1]. Scattering matrices for the process are generated using the UK R-matrix method [2, 3] and then used to compute rotational excitation cross sections for an energy range from 0 to a few eV for different combinations of initial and final rotational states of the target molecule. The approach is applied to obtain cross sections for rotational excitation of HCCH (acetylene). References: 1. M. Khamesian, *Theoretical study of negative molecular ions relevant to the interstellar and laboratory plasma,* Ph. D. thesis, University of Central Florida, 2016. 2. J. Tennyson, Phys. Rep. **491**, 29 (2010). 3. J. Tennyson, D. B. Brown, J. J. Munro, I. Rozum, H. N. Varambhia, and N. Vinci. Quantemol-N: an expert system for performing electron molecule collision calculations using the R-matrix method. J. Phys. Conf. Series, 86:012001, 2007.

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