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【412】 Rotational alignment decay and decoherence of molecular superrotors

We present the quantum master equation describing the coherent and incoherent dynamics of a rapidly rotating molecule in presence of a thermal background gas [1]. The master equation relates the rate of rotational alignment decay and decoherence to the microscopic scattering amplitudes, which we calculate for anisotropic van der Waals scattering. For large rotational energies, we find quantitative agreement of the resulting alignment decay rate with recent superrotor experiments [2].

[1] B. A. Stickler, F. T. Ghahramani, and K. Hornberger, *Phys. Rev. Lett.* **121**, 243402 (2018)

[2] A. A. Milner, A. Korobenko, J. W. Hepburn, and V. Milner, *Phys. Rev. Lett.* **113**, 043005 (2014)

Author: STICKLER, Benjamin (University of Duisburg-Essen)

Presenter: STICKLER, Benjamin (University of Duisburg-Essen)

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