

# Interaction of electron spins with mechanical modes of two-dimensional semiconductors

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Mechanical resonators made out of Transition Metal Dichalcogenide (TMDC) Monolayers show interesting mechanical and electronic properties such as a large Q factor [1-2], a sizeable direct band gap and a spin-split conduction band [3]. Strain and curvature have been proven to influence the band structure of TMDC monolayers [4]. In this talk, we investigate the interplay between mechanical motion and electronic band structure of a TMDC monolayer. We use classical continuum mechanics to obtain equations of motion for the vibration of circular TMDC resonators and to solve these equations for the fundamental mode. By considering this solution within a general approach to strained and curved TMDC monolayers [4], we derive a model for the electromechanical coupling in the device and construct a low energy effective model of the conduction band electronic states and mechanical degrees of freedom. Finally, we consider the spin dependant transport across the mechanical resonator device.

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