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Electronics and atomic scale properties of defects and dopants in 2H-$MoTe_2$ MARIA LONGOBARDI, ALBERTO UBALDINI, ENRICO GIANNINI, University of Geneva, DPMC, DAVID R. BOWLER, London Centre for Nanotechnology and Department of Physics and Astronomy, University College London,, CHRISTOPH RENNER, University of Geneva, DPMC — We present a detailed STM/STS investigation and corresponding DFT modeling of native dopants and atomic scale defects and their influence on the local electron density of states of 2H-$MoTe_2$. Semiconducting transition metal dichalcogenides (TMDs) are attracting increasing interest in the field of electronics and optoelectronics owing to their layered structure and the indirect-to-direct band gap transition when approaching the single-layer limit. 2H-$MoTe_2$ is a semiconducting TMD with a bulk band gap of around 1.0 eV. This compound shows very high mobility at room temperature and strong absorption throughout the solar spectrum. Previous studies demonstrated the possibility to achieve gate-induced ambipolar transport at the surface [1]. 2H-$MoTe_2$ is thus an attractive candidate for novel optoelectronic devices such as light-emitting diodes, photo detectors and solar cell technology. Controlling the atomic nature and density of defects and dopants is crucial for the development of the aforementioned applications and devices.

[1] *I. Gutiérrez Lezama et al.* 2D Materials **1**, 021002 (2014)

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