

物理工学談話会 6月20日 (月) 午後 14:30~

会場：総合研究棟W701 世話人：レービガー ハンネス

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Engineering point and extended defects in transition metal dichalcogenides

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Two-dimensional (2D) materials such as graphene, hexagonal boron nitride, and transition metal dichalcogenides have recently received lots of attention due to their unique material properties and numerous potential applications. The 2D atomic structure can also facilitate distinct defect formation mechanisms and offer new possibilities for defect engineering.

In my talk, I will present the results from layered molybdenum dichalcogenides (MoS₂, MoSe₂, and MoTe₂), where vacancy, substitutional, interstitial, and grain boundary defects are introduced by electron irradiation or by various chemical treatments. Due to the 2D nature, transmission electron microscopy and scanning tunneling microscopy imaging allows direct monitoring of formation and agglomeration of defects as well as of larger structural changes. First-principles calculations are used to provide microscopic insight into the energetics and kinetics of these processes. The gained understanding together with the computationally predicted defect properties can be used to guide future efforts in tailoring the 2D material properties via defect engineering.