

Two-dimensional structural phase transitions on 2D materials with structural degeneracies

Salvador Barraza-Lopez

Associate Professor of Physics

University of Arkansas

Structural degeneracies arise on unit cells with reduced symmetries that are prevalent in two-dimensional materials beyond graphene. Materials with structural degeneracies develop domains, and these structures can undergo structural transitions that can have a predominant two-dimensional character, provided that there is an energetic path among degenerate structures that is smaller than the melting point. Studies of these 2D phase transitions have been pioneered by my group [1-4], and will be demonstrated on the family of group IV-monochalcogenides. A consequence of these transitions is that the design of two-dimensional materials must take into account material properties at finite temperature, especially if the potential operation temperature happens to be close to the critical temperature associated with the 2D structural transition. In that sense, this work of a basic nature has deep consequences for potential applications of these novel materials.

References:

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