

Electronic phase transitions in highly correlated sulfides

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Metallic crystals may develop one of a series of exotic electronic states, including charge-density-waves (CDWs), superconductivity and magnetic order. Specifically the CDW instability has been associated with quasi-one-dimensional (1D) metals [1]. The canonical CDW is stabilized by Fermi surface nesting (FSN) and involves wavelike variations of the valence electron density and of the positions of the atoms, according to a common wave vector \mathbf{q} . Some CDWs can also compete or coexist with superconductivity or magnetic order [2]. The electronic properties of such crystals with strongly correlated electron systems (SCES) are governed by the electron correlations and electron-phonon coupling (EPC). In this way, CDWs have been found in metals lacking obvious FSN. In this lecture, I will present general features of CDWs in SCES and 3D metals. The structural and electronic properties of Ag_4SSe will be discussed in detail [3]. The CDW and lock-in phase transitions of CuV_2S_4 will also be presented and the relation between the electronic properties and the observed structural distortions of this compound will be elucidated [4].

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