A tunable charge density wave in the kagome metal ScV₆Sn₆

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Abstract: ScV₆Sn₆ is a newly discovered vanadium kagome metal which hosts a charge density wave (CDW) below a temperature of 92 K. I will present detailed electrical transport results on ScV₆Sn₆ and its isostructural counterpart, LuV₆Sn₆, which lacks CDW order. By comparing the electrical properties of these two materials, several important features about the CDW state that forms in ScV₆Sn₆ are unraveled. Three points stand out from the comparison between the Sc and Lu compounds. First, applying a magnetic field to ScV₆Sn₆ changes the resistivity vs temperature from metal-like to insulator-like. Next, a observe behavior akin to the anomalous Hall effect in the CDW phase of ScV₆Sn₆ is seen even without magnetic order. Lastly, the temperature dependence of the resistivity scales as T^{3/5} in ScV₆Sn₆, KV₃Sb₅, RbV₃Sb₅, and CsV₃Sb₅, suggesting that this sublinear behavior is universal among the vanadium kagome compounds which exhibit CDW. By contrast, resistivity in the non-CDW compound LuV₆Sn₆ has a linear temperature dependence in the same temperature region.

Biography: Shirin Mozaffari is a Post-Doctoral Research Associate at the University of Tennessee, Knoxville. She works at the group of Prof. David Mandrus at the Materials Science and Engineering Department. Shirin synthesizes single crystals of quantum materials and studies the electronic and magnetic properties of them by methods such as magnetotransport and torque magnetometry.