Have We Been Here Before? Inorganic Precedents for the Collective Electronic Behaviour of Molecular Crystals

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As a community focused on collective electronic properties of organic and metal-organic molecular crystals, we tend to assume that these are uniquely a consequence of the fact that the lattice is composed of molecular building blocks. However, quantum mechanics has a wider horizon and some of the phenomena currently occupying our field were observed and investigated some time ago in various purely inorganic non-molecular lattices. This talk will recall some of the latter while serving to highlight what really is unique to the molecular solid state. Examples from magnetism include one-dimensional ferromagnetism and the Haldane conjecture, superparamagnetism and complex magnetic lattice topologies; from electron transport we will mention early discussions about the possibility of low-dimensional superconductivity and the suppression of superconductivity by magnetic order.