

Electronic Properties of NbSe₂ Monolayer and Its Misfit Structures

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Abstract. Monolayer of transition metal dichalcogenide 1H-NbSe₂ represents a paradigmatic two-dimensional superconductor with unconventional Ising pairing responsible for the giant upper critical magnetic field parallel to the 1H-NbSe₂ plane [1-3]. The pairing in the monolayer occurs due to broken inversion symmetry, preserved horizontal mirror plane and spin-orbit coupling which locks the spins in the out-of-the plane direction. The centrosymmetry is recovered in the bulk 2H-NbSe₂, therefore, it is no Ising superconductor. Misfit layered structures, like (LaSe)_{1.14}(NbSe₂) and (LaSe)_{1.14}(NbSe₂)₂, consist of monolayers and bilayers of NbSe₂, exhibit also Ising protection with a Pauli-limit violation. In the talk we discuss the electronic structure of the misfit structure, charge transfer, and effect of the vacancies on the Fermi level position. The mechanisms for the Ising protection of the superconductivity in the bulk materials is highlighted [4].

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