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Anisotropy in physical properties of layered superconducting $IrTe_2$ single crystals

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Layered $IrTe_2$ is known to exhibit extremely rich physical properties with two successive phase transitions at T_1 ~ 280 K and T_2 ~ 180 K. We have grown $IrTe_2$ single crystals with typical sizes of 4×5×1.2 mm^3. This allows us to experimentally investigate its physical properties along different directions. We report the anisotropy of intrinsic transport and magnetic properties of $IrTe_2$ single crystals. The resistivity anisotropy (ρ_c/ρ_{ab}) is more than 200. The results also show the in-plane Fermi-liquid behavior. In contrast, the magnetic properties are more or less isotropic below T1. What is particularly interesting is that we observe superconducting transition at Tc ~ 2.3 K. This indicates that both structural (at T_1 and T_2) and superconducting (at Tc) transitions can coexist in this system. The implications will be discussed.

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Coherent states for the Kepler-Coulomb problem on a sphere

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The study of different classical and quantum systems in the space of constant curvature attracts attention since long time. Studying the systems similar to the hydrogen atom was initiated by Schrodinger. Incorporating the space curvauter with some algebraic considerations, provides some insights about the curvature roles in physical systems. In the present contribution we are going to investigate the Kepler problem in the space with constant curvature by pure algebric tools. The algebraic approach was first successfully used for harmonic oscillator and the dynamical algebra of this system known as Weyl-Heisenberg algebra. An important feature of harmonic oscillator is its coherent states. The associated coherent states of the harmonic oscillator and their generalizations have found many applications in various fields of physics. We study the kepler problem in a spherical space as a curved space. Our approach is based on the f–deformed oscillator and nonlinear coherent states. This problem provides us some intuitions about the Kepler motion in a curved space. By using an algebraic approach for Kepler problem, the creation and annihilation operators associated to this system and their algebra are calculated. These operators satisfy a deformed *su(2)* algebra and the nonlinear coherent states of this system are constructed. The present contribution shows that these nonlinear coherent states possess some non-classical features which strongly depend on the Kepler coupling constant and space curvature parameter. Depending on the non- classical measures, the smaller the curvature parameter, the more non-classical features. Moreover, the stronger Kepler constant provides more non-classical features.

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