

Open Talk

28th January, 2020

4:00 PM

Room 404

SPEAKER

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TITLE OF THE TALK

Superconductivity in layered Nb₂Pd(S/Se)₅ compounds

ABSTRACT

This presentation describes the preparation and detailed superconducting characterization of Nb₂PdS₅ superconductor. The results show that Nb₂PdS₅ sample is crystallized in monoclinic structure with space group C2/m. The growth of Nb₂PdS₅ sample is in layered morphology. The values of superconducting transition temperature and upper critical field for Nb₂PdS₅ sample are T_c = 6.1 K & H_{c2} = 19.1 Tesla. The upper critical field crosses Pauli paramagnetic limit by multiple times, robust nature against magnetic field. Although, the T_c is low but due to high upper critical field it has lots of practical applications. For its detailed studies, Nb₂PdS₅ sample is characterized via various measurements techniques. The thermally activated flux flow energy has also been analyzed. The temperature dependent lower critical field and specific heat measurements support multiband behavior of superconductivity. Low-temperature heat capacity in superconducting state of Nb₂PdS₅ under different magnetic fields showed s-wave superconductivity with two different gaps. Two quasilinear slopes in Sommerfeld coefficient (γ) as a function of applied magnetic field and two-band behavior of the electronic heat capacity demonstrate that Nb₂PdS₅ is a multiband superconductor in weak coupling limit with $C/\gamma T_c = 0.9$.

HOST FACULTY

Professor Thirupathiah Setti

Assistant Professor

Department of Condensed Matter Physics and Sciences

S. N. Bose National Centre for Basic Sciences
