

Theoretical Study of Tunneling Conductance in Normal-Metal/Insulator/PrOs₄Sb₁₂ Junctions

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DATE: Thursday, July 26, 2012

TIME: 3:30 pm

PLACE: C2045

ABSTRACT: Superconducting phase of PrOs₄Sb₁₂ is theoretically investigated by means of point contact Andreev reflection spectroscopy. The conductance spectrum of a normal-metal/insulator/PrOs₄Sb₁₂ junction is calculated by solving the three dimensional Bogoliubov–de Gennes equations. By using the phenomenological Landau theory, various order parameters are selected and examined as a candidate of superconductivity in PrOs₄Sb₁₂. These order parameters include both spin singlet and triplet channels. The conductance spectrum of the junction show multiple features in both singlet and triplet channels including a peak in conductance at different energy points. In particular, a zero bias conductance peak (ZBCP) can be observed in some of the spectra which is a direct result of unconventional superconductivity. Comparison with experimental results indicate that superconductivity in PrOs₄Sb₁₂ is most likely caused by an order parameter in triplet channel. However, more experimental evidences are required in order to find the actual symmetry of superconducting phase in this material.

ALL ARE WELCOME!!!