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

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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!!!