

Nodal s -wave superconductivity in $\text{BaFe}_2(\text{As,P})_2$

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I will discuss the superconducting gap structure of isovalent P-substituted system $\text{BaFe}_2(\text{As,P})_2$ system from several experimental results including penetration depth¹, thermal conductivity^{1,2}, specific heat³, and laser ARPES⁴. The crystals used in this study are very clean⁵, evidenced by the observation of quantum oscillations⁶. Strong evidence for the presence of line nodes has been obtained from penetration depth and thermal conductivity, both of which are sensitive to the high Fermi velocity parts of the multiband Fermi surfaces. From the thermal conductivity in magnetic field rotating within the ab plane², we conclude that the observed results are most consistent with the nodal s -wave, having closed nodal loops located at the flat part of electron Fermi surface with high Fermi velocity.

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