

Inelastic neutron scattering measurements on Sr_2RuO_4

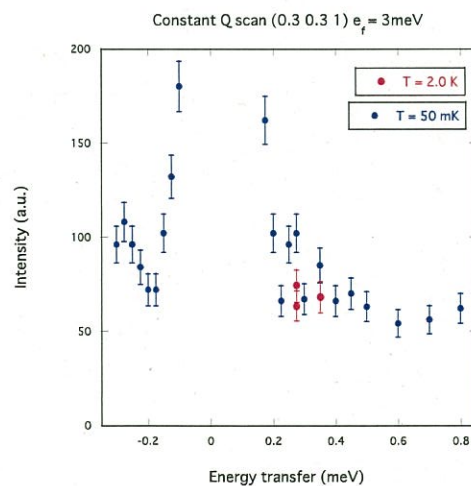
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Sr_2RuO_4 is the first 2D perovskite oxide type superconductor without copper [1]. Unlike $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$, however, it exhibits Fermi liquid behavior in its normal state, and its superconducting state has been reported to be spin triplet ($S = 1$). Small angle neutron scattering (SANS) experiments show square flux line lattice (FLL), indicating anisotropic band structure, but there is no clear evidence that magnetism contributes its superconductivity. Then we had been trying to detect resonance magnetic peaks appearing only in its superconducting state.

In the present study, we measured energy dependence of inelastic scattering intensity along some of high symmetric lines in the reciprocal space and at above and below its superconducting transition temperature, cf. $\sim 1.5\text{K}$ by using C-TAX at HFIR, USA. The result shows the intensity may increase in its superconducting phase and at reasonable energy range as shown in the figure. Apparently it is not enough statistics to conclude the change but it shows high potential. Since confirmation of this change gives strong evidence that Sr_2RuO_4 is the spin mediated superconductor. So it is very important to confirm it. Then we decided to prepare much large single crystals of Sr_2RuO_4 .

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Energy dependence of scattering intensity at (0.3 0.3 1).