Experimental report

27/02/2019

Proposal: 4-02-467 **Council:** 4/2016

Title: Superconducting gap in the one-dimensional bands in Sr2RuO4

Research area: Physics

This proposal is a continuation of 4-02-445

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Experimental team: Stefan KUNKEMOELLER

Local contacts: Paul STEFFENS

Samples: Sr2RuO4

Instrument	Requested days	Allocated days	From	To
THALES	5	5	22/09/2016	27/09/2016

Abstract:

There is ongoing debate about the symmetry of the superconducting order parameter in Sr2RuO4 which is one of the most promising materials for topological superconductivity. In our previous experiment we observe that the nesting induced fluctuations clearly persist in the superconducting state for energies significantly below 2delta, which strongly suggests that the 1d bands are not the active bands in the superconducting pairing. We want to continue with our studies in order to obtain clear information about the nature and size of the superconducting gap on the 1d bands.

Published in:

S. Kunkemöller, P. Steffens, P. Link, Y. Sidis, Z. Q. Mao, Y. Maeno, and M. Braden

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Absence of a Large Superconductivity-Induced Gap in Magnetic Fluctuations of Sr_2RuO_4

Inelastic neutron scattering experiments on Sr_2RuO_4 determine the spectral weight of the nesting induced magnetic fluctuations across the superconducting transition. There is no observable change at the superconducting transition down to an energy of ~ 0.35 meV, which is well below the 2Δ values reported in several tunneling experiments. At this and higher energies magnetic fluctuations clearly persist in the superconducting state. Only at energies below ~ 0.3 meV can evidence for partial suppression of spectral weight in the superconducting state be observed. This strongly suggests that the one-dimensional bands with the associated nesting fluctuations do not form the active, highly gapped bands in the superconducting pairing in Sr_2RuO_4.