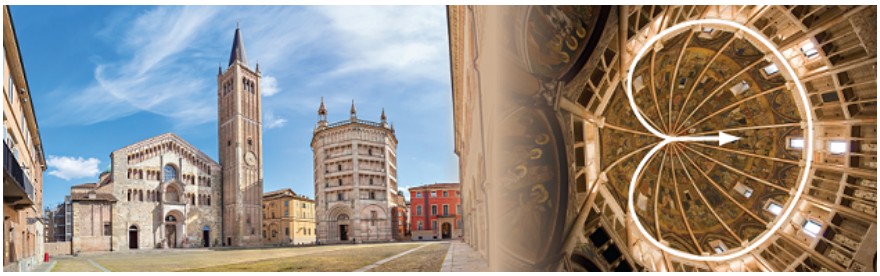

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Two-component superconductivity in Sr_2RuO_4 studied by uniaxial and hydrostatic pressure μSR

Monday, 29 August 2022 15:00 (20 minutes)

After two decades of research, the symmetry of the superconducting state in Sr_2RuO_4 is still under strong debate. The long time favoured spin-triplet px + i py state is ruled out by recent NMR experiments (1). However, in general time-reversal-symmetry breaking (TRSB) superconductivity indicates complex two-component order parameters. Probing Sr_2RuO_4 under uniaxial pressure offers the possibility to lift the degeneracy between such components (2). One key prediction for Sr_2RuO_4, a splitting of the superconducting and TRSB transitions under uniaxial pressure has not been observed so far.
Here, we report results of muon spin relaxation (μSR) measurements on Sr_2RuO_4 placed under uniaxial stress (3). We observed a large pressure-induced splitting between the onset temperatures of superconductivity (T_c) and TRSB (T_{TRSB}). Moreover, at high stress beyond the van Hove singularity, a new spin density wave ordered phase is observed.
To distinguish between a symmetry protected chiral state (d+id) and non-chiral accidentally degenerated order parameters (d+ig, f+ig) we also report μSR studies under symmetry conserving hydrostatic pressure. In these experiment no splitting between T_c and T_{TRSB} is observed (4).
In this talk we discuss the implications on the superconducting order parameter in Sr_2RuO_4.

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