Pairing symmetry of Sr2RuO4 probed by tunneling and phase-sensitive measurements

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I will present a brief overview of the current status of the Sr2RuO4 research, focusing in particular on results from quasi-particle tunneling and phase-sensitive measurements. Scanning tunneling microscope (STM) and planar tunnel junction based quasi-particle tunneling measurements, which can provide the gap value and other spectroscopy information of a superconductor important for understanding the mechanism of superconductivity, have so far yielded very different gap values, most likely due to the variation in sample preparation. Our planar tunnel junction measurements appear to indicate that Sr2RuO4 is a weak coupling superconductor with a gap value consistent with the BCS expectation. I will discuss phase-sensitive measurements aimed at determining the orientation variation of the phase of the superconducting order parameter, which was shown in the high-Tc research to be among the most powerful tools for determining the pairing symmetry of an unconventional, non-s-wave superconductor. I will present our results of the first phase-sensitive measurement on Sr2RuO4, showing compelling evidence that Sr2RuO4 is a spin-triplet, chiral p-wave superconductor, and comment on outstanding issues on pairing symmetry and other aspects of Sr2RuO4.