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**Quasiparticle lineshape of Sr2RuO4 by ARPES**

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**Introduction:** The single layered ruthenate, Sr$_2$RuO$_4$ (Sr214), has generated new interest since the discovery of superconductivity with ($T_c \sim 1$K) [1]. It is the only non-cuprate perovskite superconductor that is isostructural to the high-$T_c$ cuprate La$_{2-x}$Sr$_x$CuO$_4$. However, Sr214 has different electronic and magnetic properties from cuprates. The superconducting state of Sr214 is believed to have $p$-wave symmetry with possible enhanced ferromagnetic correlations. In contrast, cuprates have a $d$-wave order parameter with proximity to antiferromagnetic ordering. The normal state of Sr214 is also interesting. While the in-plane resistivity $\rho_{ab}$ is always metallic, the c-axis resistivity $\rho_c$ is non-metallic above $T_M \sim 130$K, and becomes metallic below $T_M$ [2]. Below 25K, both $\rho_{ab}$ and $\rho_c$ have Fermi liquid (FL) $T^2$ behavior, although with a large anisotropy of $\sim 600$ [2]. In comparison, most cuprates have non-FL transport. Moreover, $\rho_c$ in cuprates remains incoherent down to $T_c$ in most cases, implying that the cuprates are two dimensional in terms of coherent single-particle transport [3]. Therefore, the 2D-3D crossover in Sr214 may shed light on the influence of two-dimensionality on superconductivity. It is well known that charge transport is closely related to the quasiparticle (QP) scattering rate (inverse lifetime), and angle-resolved photoelectron spectroscopy (ARPES) is an ideal technique to probe the QP lifetime in 2D anisotropic electron systems. Therefore, we have proposed and performed high-resolution ARPES on single crystal Sr214 at NSLS.

**Methods and Materials:** ARPES on single crystal Sr214

**References:**

