



# IFMP Seminar

**Date:** Tuesday, June 08, 2021, at 14:50  
BigBlueButton:  
<https://selfservice.zih.tu-dresden.de/l/link.php?m=101794&p=2227ce3e> (TUD)  
<https://selfservice.zih.tu-dresden.de/link.php?m=101794&p=074474c8> (external)

**Speaker:** **Sayak Ghosh**  
*Cornell University (New York)*

**Title:** **Evidence for two-component superconductivity in  $\text{Sr}_2\text{RuO}_4$  from ultrasound measurements**

**Abstract:** The unconventional superconductivity of  $\text{Sr}_2\text{RuO}_4$  has remained a mystery for over 25 years, even though its normal metallic state is quite well understood. Reaching a consensus on the bulk order parameter symmetry has been primarily difficult due to the discrepancies that exist between several major experimental evidences [1]. We use resonant ultrasound spectroscopy to measure the entire symmetry-resolved elastic tensor of  $\text{Sr}_2\text{RuO}_4$  through the superconducting transition. We observe a thermodynamic discontinuity in the shear elastic modulus  $c_{66}$ , requiring that the superconducting order parameter is two-component [2]. We also find an anomalous increase in compressional sound attenuation immediately below  $T_c$ , in sharp disagreement with what is found in both conventional (*s*-wave) and high- $T_c$  (*d*-wave) superconductors.

[1] A. P. Mackenzie *et al.*, *npj Quant. Mater.* **2**, 40 (2017)

[2] S. Ghosh *et al.*, *Nat. Phys.* **17**, 199–204 (2021)