

## Poster-1-9

**Electronic Properties of  $\text{Sr}_2\text{IrO}_4$  -  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  Thin Film Heterostructures**

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We report the pulsed laser deposition (PLD) of multilayers of the cuprate high- $T_C$  superconductor  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  (YBCO) and the iridate  $\text{Sr}_2\text{IrO}_4$  (SIO) which exhibits a strong spin-orbit coupling (SOC) [1]. The latter has a crystal structure similar to  $\text{La}_2\text{CuO}_4$  [2] alongside peculiar magnetic properties [3] and is an ideal candidate to explore the influence of both strong SOC and magnetism on the superconductivity of the neighboring YBCO layers.

The magneto-transport characteristics of the heterostructures are investigated. They reveal a strong and comparatively long-ranged proximity effect. This gives rise to a suppression of the superconducting response of the YBCO layers up to a thickness of about 14 nm. Samples with thinner layers show a complex insulating behavior at low temperatures. Slowly increasing the YBCO thickness leads to an extremely broad superconducting transition until superconductivity is fully restored at  $\approx 20$  nm of YBCO. Moreover, we find a strong and unusual magnetic field dependence.

These results point towards a complex interplay between the strong SOC in SIO and superconductivity in YBCO and call for further studies of the microscopic electronic and magnetic properties of these layers.

[1] Kim, B. J. et al. *Science*, 323, 1329-1332 (2009).

[2] Kim, J. et al. *Physical Review Letters*, 108, 177003 (2012).

[3] Boseggia, S. et al. *Journal of Physics: Condensed Matter*, 25, 422202 (2013).