



## Invitation

### LMU-Seminar

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**Title:** Superconductivity drives magnetism in  $\delta$ -doped  $\text{La}_2\text{CuO}_4$   
**Speaker:** Dr. Andreas Suter  
Labor für Myonspinspektroskopie, PSI

**Time:** Wednesday, June 20<sup>th</sup> 2018, 14:00

**Place:** WBGB/019

#### **Abstract:**

The understanding of the interplay between different orders in a solid is a key challenge in highly correlated electronic systems. In real systems this is even more difficult since disorder can have a strong influence on the subtle balance between these orders and thus can obscure the interpretation of the observed physical properties. Here I will present a study on delta-doped  $\text{La}_2\text{CuO}_4$  ( $\delta$ - $\text{LCO}_N$ ) superlattices. By means of molecular beam epitaxy whole  $\text{LaO}_2$ -layers were periodically replaced through  $\text{SrO}_2$ -layers providing a charge reservoir, yet reducing the level of disorder typically present in doped cuprates to an absolute minimum. The induced superconductivity and its interplay with the antiferromagnetic order is studied by means of low-energy  $\mu\text{SR}$ . We find a quasi-2D superconducting state which couples to the antiferromagnetic order in a non-trivial way. Below the superconducting transition temperature, the magnetic volume fraction increases strongly. The reason could be a charge redistribution of the free carriers due to the opening of the superconducting gap which is possible due to the close proximity and low disorder between the different ordered regions.

One might think this situation being similar to superoxygenated LCO ( $\text{La}_2\text{CuO}_{4+\delta}$ ). However, there the magnetic moment is substantially reduced and the magnetic transition sets in at  $T_c$  only, whereas the  $\delta$ - $\text{LCO}_N$  SLs show the full magnetic moment ( $\sim 0.64 \mu_B$ ) and a magnetic onset temperature up to 5 times  $T_c$ .