

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Interplay of superconductivity and magnetism in oxy-chalcogen cuprates  $\text{YBaSrCu}_3\text{O}_x\text{Se}_y$** <sup>1</sup> ARMEN GULIAN, VAHAN NIKOGHOSYAN<sup>2</sup>, Chapman University, VADIM GRINENKO, Leibniz-Institute IFW-Dresden, PF 270116, Dresden D-01171, Germany — In  $\text{YBa}_2\text{Cu}_3\text{O}_7$  superconductors we substituted one atom of Sr for Ba, and simultaneously doped the composition by Se. The resulting substance demonstrates two superconducting transitions: at 34K and 12K. Moreover, at 18K it reveals the Wohleben effect, jumping from a diamagnetic to paramagnetic response, while keeping the resistance zero. At about 4K, a ferromagnetic state sets up yielding a re-entrance effect, noticeable as an upturn in magnetic susceptibility and, in some samples, in resistivity. This substance behaves very differently from the reported  $\text{YBaSrCu}_3\text{O}_7$  or  $\text{YBa}_2\text{Cu}_3\text{O}_x\text{Se}_y$ : simultaneous presence of Se- and Sr-ions yields magnetic moments in the lattice. We present data on DC and AC magnetization, on heat capacity and resistivity in magnetic fields, on crystalline phases, as well as on composition. We also discuss possible mechanisms responsible for the observed effects.

<sup>1</sup>This work is supported in part by the ONR Grant N00014-15-12095

<sup>2</sup>Also: Physics Research Institute, National Academy of Sciences, Ashtarak, 0203, Armenia

Armen Gulian  
Chapman University

Date submitted: 06 Nov 2015

Electronic form version 1.4