Room temperature ferromagnetism in CoO/Co3O4 nanocrystals — •Zi-An Li[1], Nerio Fontaíña-Troitiño[2], András Kovács[3], Sara Liébana-Viñas[1], Marina Spasova[1], Rafal E. Dunin-Borkowski3[3], Markus Müller[4], David Doennig[4], Rossitza Pentcheva[1,4], Michael Farle[1], and Veronica Salgueiriño[2] — [1]Faculty of Physics and Center for Nanointegration (CENIDE), University Duisburg-Essen,Germany — [2]Departamento de FísicaAplicada, Universidade de Vigo, Spain — [3]Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons and Peter Grünberg Institute, Research Centre Jülich, Germany — [4]Department of Earth and Environmental Sciences, Section Crystallography, LMU Munich, Munich, Germany

Hetero-interfaces formed between oxide perovskite structures can exhibit novel functionality that is not available in the bulk constituents. Here, we present a detailed high-resolution transmission electron microscopy and quantitative magnetometry study of a robust (above room temperature) environmentally-stable ferromagnetically-coupled interface layer, which forms between the antiferromagnetic rocksalt CoO cores and the surrounding 2-4 nm-thick antiferromagnetic spinel Co3O4 surface layers of octahedral nanocrystals [1, 2]. The origin of the experimentally observed ferromagnetic phase is discussed based on density functional theory calculations including a Hubbard U term.

References:
1. N. Fontaina-Troitino et al. Nano Letters 14, 640 (2014)
2. Financial support by the European Research Council Grant *IMAGINE* and SFB/TR80 is gratefully acknowledged.