Layer selective reduction of rare earth nickelate superlattices| 16GS	**Start Date:** planned Nov.1st2017
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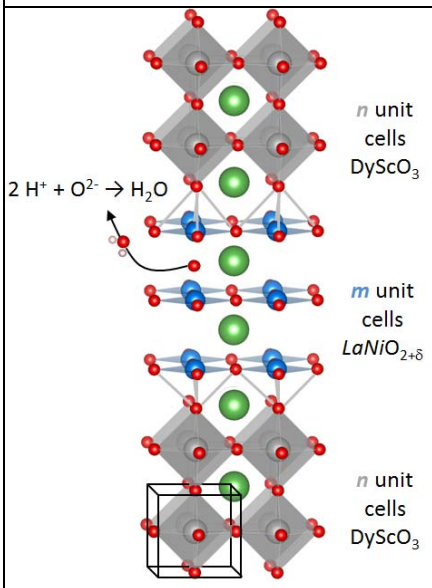

Abstract: Nanostructured materials with specialized quantum properties, like superconductivity are of central interest in modern solid state research. Complex oxides offer a large variety of available quantum states and possibilities of their manipulation through external parameters, like electric or magnetic fields, temperature, light, structural distortions, and pressure. In a thin film or multilayer further degrees of freedom, like epitaxial strain, charge transfer and electronic confinement, allow novel quantum effects to emerge, including superconductivity. A selective approach to search for new superconductors is to combine oxide materials with individual properties that are believed to be important for the occurrence of high-temperature superconductivity in a heterostructure. In this project we focus on the synthesis and investigation of a material which cannot be obtained under equilibrium conditions. In detail, we use ex-situ layer-selective chemical reduction of $LaNiO_{2+\delta}$-based superlattices to realize a crystal structure and a nickel electronic state that is as close as possible to the ones of high-temperature superconducting cuprates and investigate these multilayers by means of resonant x-ray scattering and electron microscopy.

Recent results:	**Publications:**
• First reduced superlattices have been prepared and characterized by x-ray diffraction and x-ray absorption spectroscopy to demonstrate the change in Ni valence state. • New high-pressure hydrogen oven	