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Structural and magnetic properties of $Nd_{1-x}Ca_xBaCo_2O_{5.5}$ OMAR CHMAISSEM, Physics Department - Northern Illinois University and Materials Science Division - Argonne National Laboratory, IL USA, STANISLAW KOLESNIK, Physics Department - Northern Illinois University, IL USA, BOGDAN DABROWSKI, Physics Department - Northern Illinois University and Materials Science Division - Argonne National Laboratory, IL USA, SEVDA AVCI, Materials Science Division, Argonne National Laboratory, IL USA, MAXIM AVDEEV, Bragg Institute, ANSTO, Australia, JASON HODGES, Spallation Neutron Source, Oak Ridge National Laboratory, TN USA — $R_{1-x}A_xBaCo_2O_{5.5}$ (R = rare earth, A = alkaline metal) is a relatively new class of complex oxide materials that exhibit a wide range of magnetic attributes in addition to metal/insulator switching properties, structural transitions and superstructure order parameters. In many ways, this family exhibits behaviors similar to those of the famous colossal magnetoresistive manganites; however, more complex properties have also been identified owing to the fact that the oxidation state of the cobalt ions often behave in unpredictable ways depending on the chemical composition of the investigated material and the corresponding Co local environment. Thus, Co^{3+} and Co^{4+} ions with high, intermediate and low spin states may be produced offering an additional degree of freedom to be accounted for when designing new materials with tunable magnetic properties. In this talk, I will discuss the effects of calcium substitution at the Nd sites and the various structural and magnetic models as determined by neutron powder diffraction and complementary magnetic measurements.

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