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**Structural Investigation of Spin Chain and Ladder Compound Sr14Cu24 O41 and La6Ca8Cu24O41**

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Beamline(s): X22C, X22A

The composite spin ladder and spin chain system $(La,Sr,Ca)_{14}Cu_{24}O_{41}$ has been drawn much interest in recent years [1], due to its complex phase behavior and the observation of superconductivity under high pressure in $Sr_{0.4}Ca_{13.6}Cu_{24}O_{41}$ [2]. The parent compound $Sr_{14}Cu_{24}O_{41}$ has the average copper valence of +2.25, that is, holes are already "self-doped" into the system, providing a rare "clean" hole-doped cuprate. We have carried out resonant and non-resonant x-ray scattering experiments on the parent compound $Sr_{14}Cu_{24}O_{41}$ and the un-doped compound $La_6Ca_8Cu_{24}O_{41}$, in order to understand the ordering of the doped holes and its influence on the structural properties. We find that many of the Bragg peaks associated with the $CuO_2$ chain layer show a strong temperature dependence, implying that the chain structural unit is extremely soft. In addition, we have not observed any resonant behavior of the peaks previously associated with the charge ordering [3]. This experimental results and previous local probe studies [4] suggest that the charge ordering in this system may be only short-ranged.

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