

Abstract Submitted
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Multiferroicity in the spin-1/2 quantum matter of LiCu_2O_2 ANDRIVO RUSYDI, ILKA MAHNS, SONJA MUELLER, MICHAEL RUEBHAUSEN, University of Hamburg, S. PARK, Y.J. CHOI, C.L. ZHANG, S.-W. CHEONG, Rutgers University, SERBAN SMADICI, PETER ABBAMONTE, UIUC, MARTIN VON ZIMMERMANN, DESY, GEORGE SAWATZKY, University of British Columbia — Multiferroicity in LiCu_2O_2 single crystals is studied using resonant soft x-ray magnetic scattering, hard x-ray diffraction, heat capacity, magnetic susceptibility, and electrical polarization. Two magnetic transitions are found at 24.6 K (T_1) and 23.2 K (T_2). Our data are consistent with a sinusoidal spin structure at $T_2 < T < T_1$ and with a helicoidal spin structure at $T < T_2$ giving rise to ferroelectricity. Surprisingly, above T_2 the correlation lengths of the spin structures increase as the temperature increases with dramatic changes of $\sim 42\%$ occurring along the c -axis. Our results demonstrate the intimate connection between frustration and coupling between electronic and magnetic polarizations in LiCu_2O_2 .

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