

## **Diffuse Scattering Study of 2D Superstructure in a T' Electron-Doped Cuprate Superconductor**

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It is well-known that electron-doped superconductor  $\text{Nd}_{0.85}\text{Ce}_{0.15}\text{CuO}_4$  can be reversibly rendered a superconductor or non-superconductor by appropriate high-temperature treatments in reducing or oxidizing environments, respectively. We find that superconducting samples exhibit diffuse  $(0, 0, L)$  rods of scattering at superlattice positions in the  $(H, K, 0)$  plane corresponding to a larger  $2\sqrt{2} \times 2\sqrt{2}$  unit cell. We present a synchrotron x-ray diffuse scattering analysis of this rod scattering in related compound  $\text{Pr}_{0.88}\text{LaCe}_{0.12}\text{CuO}_4$  (PLCCO) and demonstrate that it arises from a two-dimensional superstructural distortion of the  $\text{CuO}_2$  sheets rather than from cubic  $\text{Nd}_2\text{O}_3$  (bixbyite) impurities.

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