




Experiment Report Form

	Spatial inhomogeneity and planar symmetry breaking of the lattice incommensurate supermodulation in the high-temperature superconductor	Experiment number: HS-4090
Beamline:	Date of experiment: from: 23/10/2010 to: 26/11/2010	Date of report: 17/11/2011
Shifts:	Local contact(s): Manfred Burghammer	<i>Received at ESRF:</i>
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Using scanning micro-x-ray diffraction we report a mixed real and reciprocal space visualization of the spatial heterogeneity of the lattice incommensurate supermodulation in a single crystal of $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+y}$ with $T_c = 84$ K [1]. The mapping shows an amplitude distribution of the supermodulation with large lattice fluctuations at a microscale with 50% amplitude variation. The angular distribution of the supermodulation amplitude in the a - b plane shows a lattice chiral symmetry, forming a left-handed oriented striped pattern. The spatial correlation of the supermodulation is well described by a compressed exponential with an exponent of 1.5 ± 0.3 and a correlation length of $50 \mu\text{m}$, showing intrinsic lattice disorder in high-temperature superconductors.

[1] N. Poccia, G. Campi, M. Fratini, A. Ricci, N. L. Saini, and A. Bianconi, Physical Review B **84**, 100504+ (2011), URL <http://dx.doi.org/10.1103/PhysRevB.84.100504>.