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Probing helical structures in liquid crystals with resonant soft x-ray scattering at carbon edge[1] CHENHUI ZHU, CHENG WANG, ANTHONY YOUNG, ILJA GUNKEL, ALEXANDER HEXEMER, ALS, Lawrence Berkeley National Lab, FENG LIU, MSD, Lawrence Berkeley National Lab, DONG CHEN, DAVID WALBA, NOEL CLARK, LCMRC, Uni. of Colorado Boulder, WIM BRAS, DUBBLE CRG, European Synchrotron Radiation Facility, France — We report the first in-situ measurement of the helical pitch in nanofilament B4 phase, using resonant soft x-ray scattering at carbon resonant edge. A strong scattering peak was observed corresponding to ∼100 nm periodicity in layer orientation variation. The scattering is anisotropic due to the nano-filament helical structure and bond orientation sensitivity enabled by the linearly-polarized soft x-rays. In-situ measurements of the helical pitch as a function of temperature provide unique information on the B4 structure and the nature of the B2-B4 phase transition. This approach can be extended to other helical structures in liquid crystals and beyond.

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