## Abstract Submitted for the MAR17 Meeting of The American Physical Society

Polarization effect in resonant soft X-ray scattering study of helical liquid crystal phases.<sup>1</sup> CHENHUI ZHU, Lawrence Berkeley National Lab, MIROSLAW SALAMONCYZK, ANTHONY YOUNG, CHENG WANG, None, ALEXANDER HEXEMER, Lawrence Berkeley National Lab, JIM GLEESON, AN-TAL JAKLI, None, SAM SPRUNT, Kent State University, MICHAEL TUCH-BAND, MIN SHUAI, JOSEPH MACLENNAN, DAVID WALBA, None, NOEL CLARK, U. Colorado Boulder, EWA GRECKA, None, DAMIAN POCIECHA, University of Warsaw, Poland, NATASA VAUPOTIC, University of Maribor, and Jozef Stefan Institute, Slovenia — Liquid crystals form many interesting nano-scale structures, many of which can be probed with X-ray scattering techniques, such as layering in smectics, hexagonal packing of cylinders in discotics. Typically hard X-rays are used due to its high penetrating power. However, in the hard X-ray regime, the scattering contrast of some LC nanostructures can be extremely low due to their weak electron density modulation. Here we show that by utilizing the coupling between x-ray polarization and molecular bond orientation, it is possible to use polarized soft x-rays at carbon resonant k-edge to probe helical strictures, i.e. the helical nanofilament B4 phase [1], the newly discovered twist bend nematic phase [2], and the blue phase [3], which are structures with no or minimal electron density modulation. Furthermore, we will discuss the relationship between the scattering anisotropy and the polarization of the incoming x-rays. These work show the great potential of resonant soft x-ray scattering in investigating structures of high orientational order.

<sup>1</sup>Director of the Office of Science, Office of Basic Energy Sciences, of the U.S. Department of Energy under Contract No. DE-AC02- 05CH11231

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Date submitted: 30 Nov 2016

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