Vortex beams of far-infrared synchrotron radiation for spectroscopy of quantum materials at MET, NSLS-II BNL TOMASZ CYRULIK, TARAS STANISLAVCHUK, ANDREI SIRENKO, TAO ZHOU, New Jersey Inst of Tech, G. L. CARR, Brookhaven National Lab — We present a design of an optics system for conversion between conventional circularly or linearly polarized coherent synchrotron radiation into a vortex beam with a non-zero orbital angular momentum (OAM). The modified optical setup will be operational in a broad-band spectral range from 20 cm$^{-1}$ up to 4000 cm$^{-1}$ using Si and ZnSe axicone retarders producing OAM with $l = +/-1$. Beams with higher order of the OAM $l = +/-1$, +/-2, +/-3, +/-4 and +/-5 will be achieved with a motorized phase-shifting spiral mirror. Quantum materials will be studied using vortex beams at the MET beamline of NSLS-II, Brookhaven National Lab at low temperatures and in strong magnetic fields. This work is supported by NJIT-SEED Grant.