RD Toward Ba-Tagging in nEXO Using Scanning Transmission Electron Microscopy MICKEY CHIU, Brookhaven National Laboratory, NEXO COLLABORATION — ^{136}Xe has a unique capability as a neutrino-less double beta decay isotope to provide a near background-free measurement by identifying the remnant $^{136}Ba^{++}$ from the decay. This "Ba-Tagging" capability would increase the sensitivity of the nEXO experiment by a factor of 4, and allow nEXO to probe well into the normal mass hierarchy. Our group has shown that Scanning Transmission Electron Microscopes (STEM) have robust capability to image and identify single Ba atoms. However, work remains to develop the technical tools to extract the Ba ion from the LXe TPC and place it into the STEM for analysis, before this can become a practical technique. We present progress toward developing and testing a conceptual design for the entire Ba-tagging chain, from extraction of the single Ba ion out of the 5 tons of LXe to the end-stage identification in the STEM.

Mickey Chiu
Brookhaven National Laboratory