Nano-focusing Angle-resolved Photoemission spectroscopy Beamline for Emergent Quantum Materials at the Taiwan Photon Source.

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Abstract

The nano-focusing angle-resolved photoemission spectroscopy (nanoARPES) beamline is one of the nine beamlines in the second phase beamline construction plan at Taiwan Photon Source (TPS). The goal of this beamline was aimed to provide the scientific opportunities to the users whose expertise includes topological materials, 2D materials, spintronics, low dimension physics and device configuration samples etc. With a novel design of active mirror-plane grating monochromator (AM-PGM), the nanoARPES beamline is optimized at photon energy range covering from 20 eV to 650 eV with ultrahigh energy resolving power 100,000. Two beamline branches were constructed to take advantages for various scientific topics. There are two branches for nanoARPES beamline, one is Kirkpatrick-Baez (K-B) mirrors focusing ARPES branch equipped with a VLEED spin detector for conventional and spin-resolved ARPES and the other one is zone plate focusing ARPES branch with a design goal of minimum spot size 100 nm. Both branches will be started to commission in the middle of 2021. In this presentation, we will provide an overview of beamline and end station designs and the commission results.

Keywords – ARPES, Zone Plate, Electronic Structure