Contribution ID: **3** Type: **Short oral presentation**

New opportunities with Resonant Inelastic Soft X-ray Scattering in the study of spin dynamics under device-operating conditions

Collective spin excitations in quantum materials provide a revolutionary alternative for devices with improved performances and energy-efficiency, as they permit the transfer of information without requiring any movement of charge, thus eliminating the dominant source of energy dissipation.

Understanding how to manipulate these collective spin excitations would provide a foundation for the next generation of energy-efficient electronic devices. A promising direction is to undertake the study of the microscopic spin dynamics in technologically-relevant quantum materials under device-operating conditions. To this end, we will utilize soft X-ray Resonant Inelastic X-ray Scattering (RIXS) at the world-leading RIXS spectrometer at NSLS-II and develop a unique sample environment, called Opera, to replicate device working conditions. The combined use of Opera and RIXS will provide an unprecedented insight into the material properties and the behavior of the collective spin excitations when subject to device-relevant perturbations of applied current, electric-field, magnetic-field, and temperature gradient in order to explore different spin current injection mechanisms such as spin torque and spin Seebeck effect in magnonic devices. This research is supported by DOE through the five-year “Early Career Research Program” funds.

Primary author: BISOGNI, Valentina (Brookhaven National Laboratory)

Presenter: BISOGNI, Valentina (Brookhaven National Laboratory)