## **UH Physics Research Day - 2024**



Contribution ID: 27

Type: Talk

## Spectroscopic Study of the Electronic Structure in Two-dimensional Chromium trihalides

Saturday 24 February 2024 13:00 (12 minutes)

The recent discovery of ferromagnetism in 2D van der Waals Chromium trihalides  $CrX_3$  (X = Cl , Br and I) down to the monolayer has gain research attraction because of their interesting electronic and magnetic properties. The magnetic properties of  $CrX_3$  can be manipulated by applying perturbations such as external magnetic field, strain, pressure. This makes  $CrX_3$  prime candidates for spintronics and magneto-resistive memory applications. Understanding the magnetism also appears to be linked to determining the electronic levels of Cr bands near the Fermi energy. These circumstances suggest that obtaining precisely determined energy scales is a prerequisite for constructing theoretical models that explain the magnetic ground states of  $CrX_3$ . High-resolution, soft x-ray can provide improved spectral features beyond the numerous techniques previously applied to these well studied metal halide systems. We have measured Cr L-edge soft x-ray absorption spectroscopy (XAS) and resonant inelastic x-ray scattering (RIXS) spectroscopy for all  $CrX_3$  in order to understand their electronic structure. Through a systematic study, with the use of atomic multiplet simulations, we show that our approach has yielded a set of more reliably determined energy scale parameters. Ultimately, our goal is to achieve a detailed understanding of the electronic structure of  $CrX_3$  and determine how it is related to magnetic order and excitations in these fascinating systems.

## Academic year

5th year and/or beyond

## **Research Advisor**

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