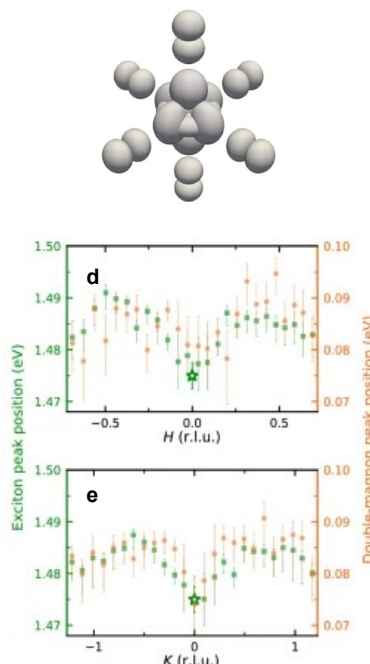
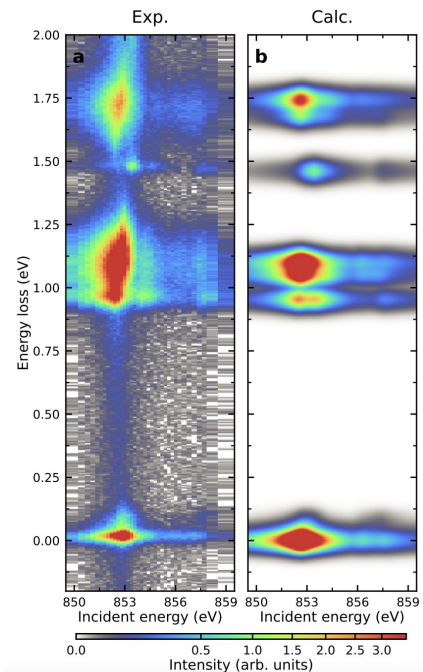


Studying Excitons in a Novel Magnetic Material

2-ID
SIX



RIXS measurements (a) and theoretical modeling (b) of NiPS₃ that were used to deduce the form of the exciton shown in (c). (d, e) Exciton dispersion mirrors the dispersion of a double magnon excitation.

He, W., Shen, Y., Wohlfeld, K., Sears, J., Li, J., Pellicciari, J., Walicki, M., Johnston, S., Baldini, E., Bisogni, V., Mitrano, M., Dean, M.P.M. *Nat Commun* **15**, 3496 (2024). doi: 10.1038/s41467-024-47852-x.

Work performed at NSLS-II

Scientific Achievement

Researchers studied the nature and propagation of "excitons" in a van der Waals (vdW) magnetic material.

Significance and Impact

The work helps elucidate the link between electronic and magnetic properties in these materials, which may form the basis of future technologies based on magnetism.

Research Details

- Excitons are coupled pairs of electrons and positively charged electron vacancies called "holes."
- They were studied in the vdW material nickel phosphorous trisulfide (NiPS₃) using resonant inelastic x-ray scattering at NSLS-II's SIX beamline.
- Results suggest, in part, that the excitons behave like collective magnetic excitations called double-magnons.