

Floquet X-Ray Scattering as a Probe of Hidden Electronic Orders

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Ultrafast spectroscopy has made it possible to directly observe light-dressed electronic structures in quantum materials, including band renormalizations and Floquet replicas. Here we ask whether such drive-induced signatures can also reveal correlations and symmetry breaking that are difficult to access with conventional probes. We show that in resonant X-ray scattering, periodic driving generates Floquet sidebands whose structure factors directly probe bond and current correlations. For charge-ordered states on the Kagome lattice, bond and loop-current orders produce distinct polarization fingerprints, with their visibility tunable by the drive frequency. More broadly, this suggests viewing Floquet X-ray scattering as a form of field-dressed imaging, a concept that could also be extended to spatially resolved probes of artificial quantum systems.

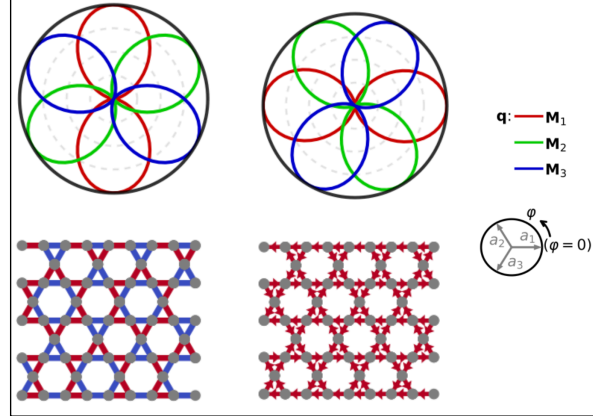


Fig. 1: Predicted Polarization dependence of Floquet Sidebands in X-ray diffraction for bond and current orders on the Kagome lattice

[1] Martin Eckstein, Eva Paprotzki, *Floquet X-Ray Scattering as a Probe of Hidden Electronic Orders*, arXiv:2604.06496.