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Frustrated magnetic pyrochlore thin films (I)

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Motivated by the recent experimental realizations of pyrochlore thin films, I will explore in this talk some of the promising facets offered by the slab geometry. Thin films are a natural platform to study the confinement of spin-liquid gauge fields and the evolution from three to two dimensional spin textures. In spin ice films for example, monopole excitations may crystallize on the surfaces, thanks to the long-range Coulomb potential between them. Depending on the type of substrate, interactions on the surfaces can be varied away from their bulk values. This offers a tuning parameter allowing for a new degree of frustration when spatial invariance is lost. More generally, I will discuss a sample of models and materials to illustrate how the mechanism ordering changes from the surfaces to the bulk and over what length scale this happens. Beyond the physics of films, the results of this research may apply to surface effects in single crystals.

Primary author: GINGRAS, Michel (University of Waterloo)

Presenter: GINGRAS, Michel (University of Waterloo)

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