1131-05-379 **Will Grilliette*** (w_g28@txstate.edu). *On Categorical Constructions of Hypergraphs.*

This talk is based on joint work with Dr. Lucas Rusnak.

In this talk, I will discuss some issues arising from the category $\mathfrak{H}$ of hypergraphs and the category $\mathfrak{M}$ of (undirected) multigraphs. Specifically, neither $\mathfrak{H}$ nor $\mathfrak{M}$ are cartesian closed, meaning that neither can be a topos, as opposed to the category $\mathfrak{Q}$ of quivers. Moreover, despite $\mathfrak{M}$ being a subcategory of $\mathfrak{H}$, $\mathfrak{H}$ does not have enough projective objects while $\mathfrak{M}$ admits a projective cover for every object.

Thus, we suggest another model of hypergraphs, and multigraphs by extension, which is based on incidence rather than adjacency. The category $\mathfrak{R}$ of these "incidence hypergraphs" will be a presheaf topos like $\mathfrak{Q}$. Indeed, $\mathfrak{Q}$ and $\mathfrak{R}$ are connected by several functors, which seem to encode matricial information into the graph structure itself. (Received July 18, 2017)