



Colloquium

Wednesday, January 22, 2020

4:30 p.m. — 5:20 p.m.

Room: 315 Armstrong Hall

Classification of subcategories and reconstruction problems

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Classification of thick subcategories has been one of the main approaches in the studies of triangulated categories for several decades. It has been studied so far in many areas such as stable homotopy theory, modular representation theory, algebraic geometry, commutative/non-commutative algebra and so on. One of the motivations of such a study is to recover some geometric information from a given category. For example, in 2005, Balmer reconstructed a noetherian scheme from the perfect derived category of it.

In this century, a beautiful theory, called *tensor-triangular geometry*, is initiated by Balmer. The theory focuses on a tensor triangulated category \mathcal{T} which is a triangulated category admitting a compatible symmetric monoidal structure. Then he defined a topological space $\text{Spec } \mathcal{T}$ which we call the *Balmer spectrum* of \mathcal{T} . Using this topological space, he classified a certain class of thick subcategories and this result enables us to do algebro-geometric studies of tensor-triangulated categories. Balmer's tensor-triangular geometry has been very successful. As Balmer addressed an invited lecture at the International Congress of Mathematicians (ICM) in 2010, tensor triangular geometry has been attracting a great deal of attention.

In this talk, I will explain some history of the classification problem of subcategories and tensor-triangulated geometry. Also, if time permits I will introduce a way to construct spectra for (not necessarily tensor) triangulated categories and give applications to commutative algebra.