March 7: Vinoth Nandakumar (MIT), "Equivariant coherent sheaves on the exotic nilpotent cone."

Let $G = Sp_{2n}(\mathbb{C})$, and $\mathcal{N}$ be Kato's exotic nilpotent cone. By studying the category of G-equivariant coherent sheaves on $\mathcal{N}$, we prove that there is a canonical bijection between Λ^+ (the dominant weights) and

$$\mathbb{O} = \{(\mathcal{O}, L) \mid \mathcal{O} \text{ a } G \text{ orbit on } \mathcal{N}, L \text{ a irreducible equivariant vector bundle on } \mathcal{O}\}.$$

This is an analogue of Bezrukavnikov's proof of the same result (conjectured by Lusztig) for the ordinary nilpotent cone.

First one proves that the higher cohomology of dominant line bundles $\mathcal{O}_{\widetilde{\mathcal{N}}}(\lambda)$ (on the exotic Springer resolution) vanishes, using techniques of Broer. We also compute the global sections of these bundles as G-modules. Next, we construct a quasi-exceptional set generating the category $D^b(Coh^G(\widetilde{\mathcal{N}}))$, indexed by Λ^+, and prove that the resulting t-structure coincides with the perverse coherent t-structure. Examining the bijection between costandard objects and irreducible objects in the heart of this t-structure will now give the required result.