Speaker: Niklas Garner

Abstract: Three-dimensional N=4 quantum field theories sit in a privileged place in the realm of supersymmetric quantum field theories. They (often) possess intricate moduli spaces of vacua, they admit two distinct topological twists, and they exhibit rich dualities such as 3d mirror symmetry that exchanges these topological twists. Recently, there has been a flurry of new examples of such theories that depart from this first feature: they have zero-dimensional Higgs and Coulomb branches of vacua. These theories generally have no Lagrangian description with manifest N=4 supersymmetry, but the topological theories obtained by twisting are nonetheless quite tame. In the first part of the talk, I will review/introduce a two-parameter family of rank 0 SCFTs constructed with T. Creutzig and H. Kim and our proposal for the boundary vertex operator algebras whose modules represent line operators in their topological A- and B-twists, extending the family of theories discovered by D. Gang, H. Kim and S. Stubbs and also studied by myself with A. Ferrari and H. Kim. In the second part of the talk, I will describe how the insights gleaned from this physical analysis lead myself and T. Creutzig to prove a family of q-series identities generalizing the Andrews-Gordon and Rogers-Ramanujan identities whose validity was conjectured in earlier work of O. Warnaar and W. Zudilin.

Speaker: Jinwei Yang

Abstract: In a celebrated series of work, Kazhdan and Lusztig constructed braided tensor category structure on the category of finite length modules for the affine Lie algebras when the level plus dual Coxeter number is not a positive rational number, and proved that the category is braided equivalent to the category of finite dimensional weight modules for the quantum groups. In this talk, we discuss our recent progress on tensor categories at positive rational levels using vertex operator algebraic approach. Concretely, We construct braided tensor category structure on the category of finite length modules for simple affine vertex operator (super)algebras and prove rigidity in some cases. For affine sl_2 Lie algebra, we study two bigger representation categories, one is the category of weight modules for the simple affine vertex operator algebra, we prove its rigidity, the other is the category of finite length modules for the universal affine vertex operator algebra, this category is not tensor equivalent to the category of quantum groups, we prove it is derived equivalent to the category of the quantum groups. This talk is based on a series of joint work with T. Creutzig, Y.-Z. Huang and R. McRae.