

# Towards the Classification of Prime Simple Modules for Quantum Affine Algebras

Adriano Moura, Clayton Silva

Universidade Estadual de Campinas

It is well-known that the tensor products of two simple finite-dimensional representations for the quantum affine algebras are almost always irreducible. Thus, it is natural to seek for the classification of the simple prime modules, i.e., those which cannot be expressed as a non trivial tensor product of other simple modules. The classification is known only in the case the underlying simple Lie algebra is of rank one. In higher rank, only a few families of prime modules are known, such as the minimal affinizations (including the Kirillov-Reshetikhin modules), the minimal affinizations by parts, the prime snake modules introduced by Mukhin and Young, and a list of primes in type  $A_2$  described by Chari and Pressley.

One important development in the area was the discovery by Hernandez and Leclerc that certain small subcategories of that of finite-dimensional representations provide a monoidal categorification of certain cluster algebras and the prime modules correspond to the cluster variables.

In this talk, based on an ongoing joint work with Clayton Silva, I will report on our progress towards the classification of simple prime modules.