Representation Theory, Geometry & Combinatorics Seminar

Organizer: Mark Haiman & Kolya Reshetikhin

Monday, 4:00–6:00pm, 939 Evans

April 21 **Andrew Linshaw**, UCSD

Invariant chiral differential operators

Given a finite-dimensional Lie algebra $\mathfrak{g}$ and a $\mathfrak{g}$-module V, the ring $D(V)^{\mathfrak{g}}$ of invariant differential operators is a much-studied object in classical invariant theory. It has a natural vertex algebra analogue. First, $D(V)$ has a VA analogue $S(V)$ known as a $\beta\gamma$-system or algebra of chiral differential operators. The action of $\mathfrak{g}$ on V induces an action of the corresponding affine algebra on $S(V)$. The invariant space $S(V)^{\mathfrak{g}[t]}$ is a commutant subalgebra of $S(V)$, and plays the role of $D(V)^{\mathfrak{g}}$. In this talk, I'll describe $S(V)^{\mathfrak{g}[t]}$ in some basic but nontrivial cases: when $\mathfrak{g}$ is abelian and the action is diagonalizable, and when $\mathfrak{g}$ is one of the classical Lie algebras $\mathfrak{sl}(n)$, $\mathfrak{gl}(n)$, or $\mathfrak{so}(n)$, and $V = \mathbb{C}^n$. The answer is often a surprise: for example, when $\mathfrak{g} = \mathbb{C} = V$, $S(V)^{\mathfrak{g}[t]}$ is the Zamolodchikov W_3 algebra with central charge $c = -2$.