ASSOCIATIVE ALGEBRAIC APPROACH TO LOGARITHMIC CONFORMAL FIELD THEORY

Hubert Saleur

IPhT, CEA Saclay, and USC, Los Angeles

Logarithmic Conformal Field Theories (LCFT) play a key role, for instance, in the description of critical geometrical problems (percolation, self avoiding walks...), or of critical points in several classes of disordered systems (transition between plateaux in the integer quantum Hall effect...). Much progress in their understanding has been obtained by studying algebraic features of their lattice regularizations. For reasons which are not entirely understood, the non semi-simple associative algebras underlying these lattice models - such as the Temperley Lieb algebra or the blob algebra - indeed exhibit, in finite size, properties that are in full correspondence with those of their continuum limits. This applies to the structure of indecomposable modules, but also to fusion rules, and provides an 'experimental' way of measuring couplings, such as the 'number b' quantifying the logarithmic coupling of the stress energy tensor with its partner. Most results obtained so far have concerned boundary LCFTs, and the associated indecomposability in the chiral sector. While the bulk case is considerably more involved (mixing in general left and right moving sectors), progress has also been made in this direction recently, uncovering fascinating structures. My talk will be a review of our state of understanding of the topic.

Keywords: Logarithmic conformal field theory, indecomposable modules, non semi-simple associative algebras, quantum groups.