ID de Contribution: **98**   Type: **Non spécifié**

A modern view on Universal Asymptotic Formulae in 2d CFTs

Any two-dimensional Conformal Field Theory (CFT) is defined via a list of primary operators, along with their scaling dimensions, spins and OPE coefficients. This set of data, along with the central charge, uniquely defines any correlation function of the theory on an arbitrary Riemann surface. Using consistency conditions like crossing symmetry and modular invariance, one can show that there are features of this data that are universal for all two-dimensional CFTs. A celebrated example of that statement is the Cardy formula for the asymptotic density of primary states at any finite value of the central charge greater than unity. The purpose of this talk is to present a new such universal formula that involves the square of the OPE coefficients for heavy operators at finite central charge. The derivation bypasses the need to compute Virasoro Blocks and uses the relatively old but newly-analyzed tool of the Fusion and Modular kernels, which relate Virasoro blocks in a given channel with a linear combination of blocks in a different channel. Their closed-form expression is known at finite central charge (greater than unity) due to B.Ponsot and J.Teschner. We will also demonstrate that general crossing kernels for arbitrary Virasoro blocks on any Riemann surface can be readily constructed out of the known kernels for the sphere four-point and the torus one-point conformal blocks.

Type of contribution

Contributed Talk or Poster

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Classification de Session: Posters

Classification de thématique: Posters