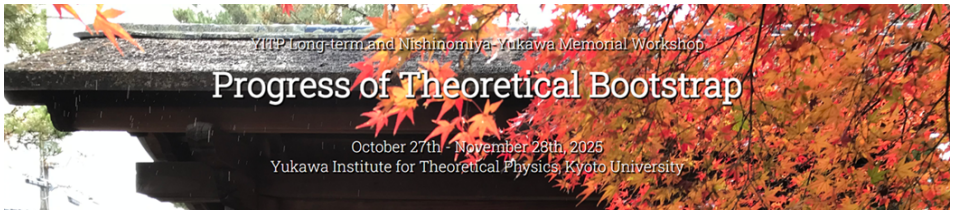


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# Sridip Pal "Universality of spectrum at large spin in non-rational 2D CFT"

*Monday, November 10, 2025 3:30 PM (1 hour)*

Abstract: In a unitary 2D modular invariant CFT, the high-energy density of states is universal and follows the famous Cardy formula, the precise version of which requires an averaging over an order-one window. In non-rational 2D CFTs, an extended version of the Cardy formula exists for the density of states with finite twist and large spin. In this talk, we will answer in which sense this extended formula gives a coarse-grained approximation of finite twist, large spin density of states. In particular, using elementary complex analysis methods, we prove that 1) the averaging over spin is NOT required and 2) if appropriately smeared over a window of twist, the extended Cardy formula is valid up to O(J^{-N}) for any N>0. This is much stronger/universal than the usual Cardy formula at large energy. Furthermore, by making the size of twist-window shrinking to 0 as J \to\ infty, we prove that the spectrum is dense in the large spin limit i.e, the spacing of operators with large spin and twist lying in a bound subinterval of ((c-1)/12,\infty) goes to 0 at least as fast as J^{-1/4} as J\to\infty. This is based on work with Jiaxin Qiao, Balt C van Rees, arXiv: 2505.02897