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Department of
Theoretical Physics

Universality of the microcanonical entropy at large spin in non-rational 2D CFTs

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The zoom link will be sent separately.

We consider the rigorous consequences of modular invariance for two-dimensional unitary non-rational CFTs with c >1. Simple estimates for the torus partition function can lead to remarkably strong results. In particular, we show that the spectral density of spin J operators must grow like $\frac{1}{\sqrt{2J}} \exp\left(\pi \sqrt{2/3(c-1) J}\right)$ in any twist interval at or above (c-1)/12, with a known twist-dependent prefactor. This proves that the large J spectrum becomes dense even without averaging over spins. The microcanonical entropy is universal with an error of little o of J. For twists below (c-1)/12, we establish that the growth must be strictly slower. Finally, we estimate how fast the maximal gap between two spin-J operators must go to zero as J becomes large.

This will be based on arXiv 2505.02897 [hep-th] with Jiaxin Qiao and Balt C van Rees.