Institut Henri Poincaré

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String Theory in Greater Paris

Rencontres Théoriciennes

“Supergravité, théorie des cordes et théorie M”

Jeudi 19 Décembre 2019, 10:00

Dalimil Mazac

Stony Brook

Sphere packing, modular bootstrap and extremal functionals

I will prove a theorem about 2D CFTs : Every unitary 2D CFT must contain a non-trivial Virasoro primary of scaling dimension at most c/8 + 1/2, where c is the central charge. At large c, this is an improvement of the Hellerman bound c/6 + O(1), and is relevant for constraining the spectrum of gravitational theories in AdS3. The proof follows from the modular bootstrap and uses analytic extremal functionals, originally developed in the context of four-point SL(2) conformal bootstrap. In the second part of the talk, I will discuss a surprising connection between modular bootstrap and the sphere-packing problem from discrete geometry. In particular, the above bound on the gap becomes a bound on the sphere- packing density. In 8 and 24 dimensions, this bound is sharp and leads to a solution of the sphere- packing problem in these dimensions, as originally proved by Viazovska et al.

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