



## SOLVAY COLLOQUIUM



**Prof. Julian Sonner**  
Université de Genève, Switzerland

### **Building spacetime from chaos**

I will describe recent developments in formulating theories of quantum gravity as arising from the tell-tale correlations of quantum chaos. This gives an interesting application of the statistical physics to the realm of gravity; I will begin my colloquium by motivating in general terms the gravitational questions of interest and introducing the necessary background in statistical physics to describe our more recent work to address these. Our approach represents a bridge between the statistical mechanics of chaotic systems and the theory of gravity, giving a new perspective on the mechanism of the emergence of spacetime. More specifically, we generate random triangulations of spacetime from generalised Wigner-type ensembles of quantum chaotic correlations, generalising old ideas on random matrix theory. In concrete examples, the relevant matrix/tensor models can be derived by formalising the notion of the 'statistics of the crossing equation', or in other words the 'statistical conformal bootstrap'. I will discuss the relationship of these random matrix/tensor models to the physics of chaotic conformal field theories (CFT) underlying them.

**Tuesday 26 March 2024 at 4:00 P.M.**

**COFFEE AND TEA WILL BE SERVED AT 3:45 P.M IN FRONT OF THE SOLVAY ROOM**

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