



Seminar/Talk

# Tracy-Widom limit for free sum of random matrices

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Host: Laszlo Erdős

In this talk, we will discuss edge universality for the sum of two independent, unitarily invariant, Hermitian random matrices of size  $N$  with deterministic eigenvalues. To be specific, we will prove that the fluctuations of the largest eigenvalue for such an ensemble asymptotically follow the GUE Tracy-Widom distribution when  $N$  tends to infinity, under some assumptions on the eigenvalues of summands ensuring that the density of states decays as square root. Firstly, we will focus on describing its limiting eigenvalue distribution and explaining connections to free probability. Next we will briefly discuss the proof, which mainly concerns entrywise local laws and Green function comparison applied to the Dyson matrix flow with time scale  $N^{-1/3}$  along with free probabilistic analysis of its deterministic equivalent. This talk is based on a joint work with Jaewhi Park.

**Thursday, October 14, 2021 04:15pm - 05:15pm**

Heinzel Seminar Room (I21.EG.101), Office Building West



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: <https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.