



**UNIVERSITÄT
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Faculty of Physics



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THE UNIVERSITY OF
MELBOURNE

Seminar

Bielefeld - Melbourne Random Matrices

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Tecnico Lisboa

Symmetries and universality in the non-Hermitian Sachdev-Ye-Kitaev model

The non-Hermitian Sachdev-Ye-Kitaev model (nHSYK), a model of N strongly-coupled Majorana fermions with random all-to-all q -body non-unitary interactions, is receiving increasing attention because of its possible role as a paradigmatic solvable example of non-Hermitian quantum chaos. In this talk, I will discuss how its local level statistics are well described by (non-Hermitian) random matrix theory (RMT) for $q > 2$, while for $q = 2$ it is given by the equivalent of Poisson statistics. For that comparison, we combine exact diagonalization numerical techniques with tools from RMT, in particular complex spacing ratios. Depending on q and N , we identify 19 out of the 38 non-Hermitian universality classes in the nHSYK model, some of which involve universal bulk correlations of classes Alt and Allt, beyond the Ginibre ensembles. At the end, I will also address the probability distribution of the singular values of the nHSYK model, which, in the limit of a large number N of Majoranas, can be related to the weight function of the Al-Salam-Chihara Q -Laguerre polynomials.

Wednesday, 09 February 2022, 0900 hrs CET

Zoom Conference Call— Please contact Gernot Akemann
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