

When J. Ginibre met E. Schrödinger

The real Ginibre ensemble consists of square real matrices whose entries are i.i.d. standard normal random variables. In sharp contrast to the complex and quaternion Ginibre ensemble, real eigenvalues in the real Ginibre ensemble attain positive likelihood. In turn, the spectral radius of a real Ginibre matrix follows a different limiting law for purely real eigenvalues than for non-real ones. Building on previous work by Rider, Sinclair and Poplavskiy, Tribe, Zaboronski, we will show that the limiting distribution of the largest real eigenvalue admits a closed form expression in terms of a distinguished solution to an inverse scattering problem for the Zakharov-Shabat system. This system is directly related to several of the most interesting nonlinear evolution equations in 1+1 dimensions which are solvable by the inverse scattering method, for instance the nonlinear Schrödinger equation. The results of this talk are based on the recent preprint [arXiv:1808.02419](https://arxiv.org/abs/1808.02419), joint with Jinho Baik.