Abstract

We consider weakly confined particle systems in the plane, characterized by a large number of outliers away from a droplet, where the bulk of the particles accumulate in the many-particle limit. For Coulomb gases at determinantal inverse temperature, and zeros of random polynomials, we observe that the limiting outlier process only depends on the shape of the uncharged region containing them (and the global net excess charge).

In particular, for a determinantal Coulomb gas confined by a sufficiently regular background measure, the outliers in a simply connected uncharged region converge to the corresponding Bergman point process. Moreover, the outliers in different uncharged regions are asymptotically independent, even if the regions have common boundary points. The latter result is a demonstration of screening properties of the particle system.

Based on a joint work with R. Butez, D. García-Zelada, and A. Wennman (arXiv:2104.03959).