

The 2D Coulomb gas and the Gaussian free field

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We prove a quantitative central limit theorem for linear statistics of particles in the complex plane, with Coulomb interaction at any temperature. This generalizes works by Rider, Virag, Ameur, Hendenmalm and Makarov obtained for the inverse temperature $\beta=2$. The main tools are a multi scale analysis and the Ward identity (or loop equation). This is joint work with Roland Bauerschmidt, Miika Nikula and Horng-Tzer Yau.