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Finite temperature free fermions and the Kardar-Parisi-Zhang equation at finite time

I will consider a system of N one-dimensional free fermions confined by a harmonic well. At zero temperature (T=0), this system is intimately connected to random matrices belonging to the Gaussian Unitary Ensemble. In particular, the density of fermions has, for large N, a finite support and it is given by the Wigner semi-circular law. Besides, close to the edges of the support, the quantum fluctuations are described by the so-called Airy-Kernel (which plays an important role in random matrix theory). What happens at finite temperature T ? I will show that at finite but low temperature, the fluctuations close to the edge, are described by a generalization of the Airy kernel, which depends continuously on temperature. Remarkably, exactly the same kernel arises in the exact solution of the Kardar-Parisi-Zhang (KPZ) equation in 1+1 dimensions at finite time.