Research Highlight: Universality of nonintersecting Brownian motions with a wall

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The model that a large number of particles in nonintersecting and otherwise independent 1-dimensional Brownian motions has been studied extensively. If the starting points are identical and the ending points are also identical, this model is a dynamical generalization of the Gaussian unitary ensemble in random matrix theory. The edge particles has a limiting distribution that occurs in the probability models of the 1-dimensional Kardar–Parisi–Zhang universality class. If a wall, either an absorbing wall or a reflecting wall, is placed close to the position of the edge particles in the nonintersecting Brownian motion model, the limiting behaviour of the edge particles will be altered. Karl LIECHTY (DePaul University) and WANG Dong (NUS) computed the limiting distribution of the edge particles with an absorbing or reflecting wall. Furthermore, the limiting distribution is expressed explicitly in the Flaschka–Newell Lax pair for Painlevé II equation. It is also shown that the limiting distribution occurs in several other probability models.

References:

Karl Liechty, and Dong Wang. Nonintersecting Brownian bridges between reflecting or absorbing walls. Adv. Math., 309:155–208, 2017