

On minimizing curves in a Brownian potential

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In this talk, we consider a semi-discrete random variational problem that can be interpreted as the geometrically linearized version of the critical 2-dimensional random field Ising model. To leading order the minimal energy shows logarithmic corrections to the natural volume scaling. We discuss a quenched homogenisation result in the sense that when properly rescaled this leading order contribution becomes deterministic as the ratio system size / lattice spacing diverges. On the other hand, we establish bounds that yield tightness of the law of minimizers in the space of continuous functions as the lattice spacing is sent to zero.

References:

- [1] B. Dembin, D. Elboim, and R. Peled: Minimal surfaces in strongly correlated random environments. *arXiv preprint* arXiv:2504.10379 (2025).
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