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*Scaling limit of a directed polymer among a Poisson field of independent walks*

This talk is based on a joint work with Hao Shen, Rongfeng Sun and Lihu Xu.

We consider a directed polymer model in dimension  $1 + 1$ , where the disorder is given by the occupation field of a Poisson system of independent random walks on  $\mathbb{Z}$ . In a suitable continuum and weak disorder limit, we show that the family of quenched partition functions of the directed polymer converges to the Stratonovich solution of a multiplicative stochastic heat equation (SHE) with a Gaussian noise, whose space-time covariance is given by the heat kernel.

In contrast to the case with space-time white noise where the solution of the SHE admits a Wiener-Itô chaos expansion, we establish an  $L^1$ -convergent chaos expansions of iterated integrals generated by Picard iterations. Using this expansion and its discrete counterpart for the polymer partition functions, the convergence of the terms in the expansion is proved via functional analytic arguments and heat kernel estimates. The Poisson random walk system is amenable to careful moment analysis, which is an important input to our arguments.