Diffusive limit for self-repelling Brownian polymers in $d \geq 3$

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We investigate the asymptotic behaviour of the self-repelling Brownian polymer model initiated by Durrett and Rogers in 1992. We identify a natural stationary (in time) and ergodic distribution of the environment (essentially, gradient of smeared-out occupation time measure of the process), as seen from the moving particle. We prove that in three and more dimensions, in this stationary (and ergodic) regime, the displacement of the moving particle scales diffusively and its finite dimensional distributions converge to those of a Wiener process. The main tool is the non-reversible version of the Kipnis–Varadhan-type CLT for additive functionals of ergodic Markov processes and a relaxation of Varadhan's Sector Condition.

(Joint work with Illés Horváth and Bálint Vető)