

# AN ISOMORPHISM THEOREM FOR ANHARMONIC FIELDS AND SCALING LIMITS

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We introduce a natural measure on bi-infinite random walk trajectories evolving in a time-dependent environment driven by the Langevin dynamics associated to a gradient Gibbs measure with convex potential. We derive an identity relating the occupation times of the Poissonian cloud induced by this measure to the square of the corresponding gradient field, which is not Gaussian. In the quadratic case, we recover a well-known generalisation of the second Ray-Knight theorem. We further determine the scaling limits of the various objects involved in dimension 3, which are seen to exhibit homogenization. In particular, we prove that the renormalized square of the gradient field converges under appropriate rescaling to the Wick-ordered square of a Gaussian free field on  $R^3$  with suitable diffusion matrix, thus extending a celebrated result of Naddaf and Spencer regarding the scaling limit of the field itself.

This is a joint work with Pierre-Francois Rodriguez

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## References

- [1] SURNAME, NAME AND SURNAME, NAME: *title of article*,  
Journal's name, number, issue, pages range (year).