

Some Recent Developments on the Geometry of Random Spherical Eigenfunctions

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A lot of efforts have been devoted in the last decade to the investigation of the high-frequency behaviour of geometric functionals for the excursion sets of random spherical harmonics, i.e., Gaussian eigenfunctions for the spherical Laplacian Δ_{S^2} . In this talk we shall review some of these results, with particular reference to the asymptotic behaviour of variances, phase transitions in the nodal case (the Berry's Cancellation Phenomenon), the distribution of the fluctuations around the expected values, and the asymptotic correlation among different functionals. We shall also discuss some connections with the Gaussian Kinematic Formula, with Wiener-Chaos expansions and with recent developments in the derivation of Quantitative Central Limit Theorems (the so-called Stein-Malliavin approach).