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**Title: On the theory of fluctuations in stochastic homogenization**

**Abstract:**

This talk focuses on stochastic homogenization for linear elliptic equations in divergence form. In particular, we study weakly correlated Gaussian environments and emphasize on the recently developed theory of fluctuations. More precisely, it has been observed that the fluctuations of averages of the solution are captured by the so-called standard homogenization commutator  $\Xi$ , an object given in term of the homogenization corrector. This suggests that a more delicate analysis of  $\Xi$  is needed. Our aim is to explain how  $\Xi$  decorrelates on large scales when it is averaged on balls which are far enough. We give a quantitative characterization of this decorrelation in terms of both the macroscopic scale and the distance between the balls showing that  $\Xi$  inherits the locality properties of the environment.