1127-60-149 **Magda Peligrad*** (peligrm@ucmail.uc.edu), Department of Mathematical Sciences, PoBox 210015, Cincinnati, OH 45221-0025, and **Na Zhang**. *Central limit theorem for discrete double Fourier series of random fields.* Preliminary report.

The talk is motivated by the properties surrounding the spectral density of a process and of a random field. We start by presenting a characterization of the spectral density in function of projection operators on sub-sigma fields. We also point out that the limiting distribution of the real and the imaginary part of the Fourier transform of a stationary random field is almost surely an independent vector with Gaussian marginal distributions, whose variance is, up to a constant, the field's spectral density. The dependence structure of the random field is general and we do not impose any conditions on the speed of convergence to zero of the covariances, or smoothness of the spectral density. The only condition required is that the variables are adapted to a partially commuting filtration and are regular in some sense. The results go beyond the Bernoulli fields and apply to both short range and long range dependence. The method of proof is based on new probabilistic methods based on martingale approximations and also on borrowed tools from harmonic analysis. Several examples to linear, Volterra and Gaussian random fields will be presented. (Received February 01, 2017)