

1) *Fisica della Materia - Meccanica Statistica*

## **Dynamical Field Theory Approach to Random Neural Networks**

*Docente/i: Crisanti Andrea* - [andrea.crisanti@phys.uniroma1.it](mailto:andrea.crisanti@phys.uniroma1.it) Dipartimento di Fisica Sapienza

*crediti: 3 - periodo/nizio: da definire da marzo /fino giugno /*

Different methods have been developed to analyze the dynamical behavior of large size random neural networks. Many of them make use of results valid in the limit of very large size. These approaches, however, suffer of potentially severe limitations because are generally not systematic and it is difficult to consider the corrections to the theory. These limitations can be overcome constructing a Dynamical Field Theory using the Path Integral method developed for Stochastic Differential Equations (SDEs).

The course can be divided into three main parts

- \*) Path Integral method for SDE
- \*) Application to Neural Networks: a soluble model
- \*) How to deal with more complex Neural Networks, dynamical perturbation

Crediti: 3 (20 ore)

Periodo: Febbraio - Giugno