Dipartimento di Scienze Matematiche
"G. L. Lagrange"
Politecnico di Torino

Colloquium

Il giorno martedì 11 novembre, alle ore 14.30 in Aula Buzano, il Professor

László Erdős

dell'Institute of Science and Technology di Vienna, terrà la conferenza dal titolo

Universality for random matrices and log–gases

Abstract. Eugene Wigner's revolutionary vision predicted that the energy levels of large complex quantum systems exhibit a universal behavior: the statistics of energy gaps depend only on the basic symmetry type of the model. These universal statistics show strong correlations in the form of level repulsion and they seem to represent a new paradigm of point processes that are characteristically different from the Poisson statistics of independent points. Simplified models of Wigner's thesis have recently become mathematically accessible. For mean field models represented by large random matrices with independent entries, the celebrated Wigner-Dyson-Gaudin-Mehta (WDGM) conjecture asserts that the local eigenvalue statistics are universal. For invariant matrix models, the eigenvalue distributions are given by a log-gas with potential V and inverse temperature $\beta = 1, 2, 4$. For $\beta \notin \{1, 2, 4\}$, there is no natural random matrix ensemble behind this model, but the analogue of the WDGM conjecture asserts that the local statistics are independent of V. In this lecture I explain the main ideas leading to the recent solution of these conjectures.