Center for Applied Mathematical Sciences Distinguished Lecturer, Spring 2017

Michael Aizenman
Princeton University

Stochastic Geometry of Correlations in Stat-Mech and Quantum Systems

Abstract:
Some of the qualitative features of interacting classical and quantum systems can be illuminated through stochastic geometric representations. In these, the correlations in some of the basic model are presented as mediated through fluctuating clusters and/or random loops. Such representations facilitate insights on a number of phenomena, including: existence of phase transitions related to the onset of long range order, dimension dependence of the critical exponents in Ising type models, the emergence of conformal invariance in critical two dimensional models and relations with the conformally invariant SLE random curves. For one dimensional quantum spin chains a stochastic geometric representation allows us to shed light on the difference between the integer and half integer cases in the spectral (Haldane) gap.

In the talk we tread on grounds which were earlier marked by USC Professor Mark Kac, to whose memory this lecture is dedicated.

Monday, April 3, 2017

Kaprielian Hall

Reception: 3:00 p.m., KAP 410

Lecture: 3:30 p.m., KAP 414

Wine & Cheese: 4:30 p.m., KAP 410

Michael Aizenman is a Professor of Physics and Mathematics at Princeton University. His research concerns topics which present challenges and opportunities for analysis and probability theory, which are however motivated by their relevance for physics. His many honors and awards include the AMS-SIAM Norbert Wiener Award (1990), the Brower Medal (2002), Doctor Honoris Causa from the University de Cergy Pontoise (2009), the APS Heineman Prize (2010), the Simons Fellowship in Mathematics (2012). He is a Fellow of the AMS and a Member of the National Academy of Sciences.

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