

Meeting: 1003, Atlanta, Georgia, ZELDITCH, AMS Invited Address

1003-32-4

Steven Zelditch*, Johns Hopkins University, Department of Mathematics, 3400 N Charles Street, 404 Krieger, Baltimore MD 21218-2689. *Random Complex Geometry, or How to count universes in string theory.*

Random complex geometry is about the behavior of random algebraic varieties. Imagine the variety defined as the zeros of a system of polynomial equations, and regard the coefficients of the polynomials as random variables, e.g., independent Gaussian random variables. One then asks how the zeros are distributed, whether they tend to repel or attract, how likely are holes or voids in the zeros, and so on.

My talk will start from scratch with random polynomials of one variable and move up to random holomorphic sections of line bundles over complex manifolds. I will concentrate on critical points of random functions and their applications in physics. The main application is to string theory. As I will explain, the possible universes in string/M theory are critical points of certain holomorphic sections. I will describe joint work with M.R. Douglas and B. Shiffman on how to count such universes for a physically relevant ensemble of sections. No knowledge of string theory is assumed; I hope my talk will give a glimpse of some analytic problems in string theory (raised by Douglas and others). (Received March 22, 2004)