

Courant Institute of Mathematical Sciences
Mathematics Colloquium
March 29, 2010

Speaker: I.M. Singer

Title of talk: Beyond the Elliptic Genus
[joint work with Orlando Alvarez]

Abstract: A genus is a homomorphism Φ from a cobordism ring to a commutative ring R with unit. I'll begin with examples of F. Hirzebruch where R is the ring of integers. Then I'll describe some of the work of S. Ochanine and P.S. Landweber where R is the ring of modular forms for an elliptic curve, i.e., a Riemann surface with genus $g=1$; Φ is the elliptic genus.

I'll explain the physics derivation of the elliptic genus using the Dirac-Ramond operator on loop space. That leads to a new cobordism ring, string cobordism, and a new genus with values in the ring of modular forms for surfaces with genus $g>1$.

I'll end with speculations on possible applications of this generalized string genus.

I.M. Singer