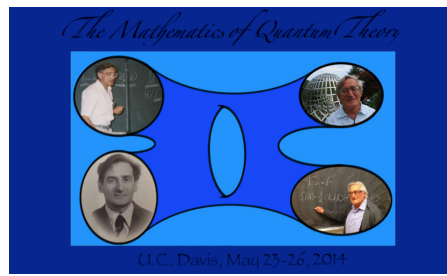


The Mathematics of Quantum Theory



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Moduli of super Riemann surfaces

Friday, May 23, 2014 2:00 PM (45 minutes)

Albert Schwarz has made some of the most decisive early contributions to the theory of super Riemann surfaces and its connections with perturbative superstring theory. This subject has been revisited in recent works of Witten, and is rapidly developing in the form of super algebraic geometry. In this talk I will survey some of these recent developments.

We will study various aspects of supergeometry, including obstruction, Atiyah, and super-Atiyah classes. This will be applied to the geometry of the moduli space of super Riemann surfaces. We prove that for genus greater than or equal to 5, this moduli space is not projected (and in particular is not split): it cannot be holomorphically projected to its underlying reduced manifold. Physically, this means that certain approaches to superstring perturbation theory that are very powerful in low orders have no close analog in higher orders. Mathematically, it means that the moduli space of super Riemann surfaces cannot be constructed in an elementary way starting with the moduli space of ordinary Riemann surfaces. It has a life of its own. If time allows, we will describe some of the other new features of this space. (This is based on joint work with E. Witten)

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