



## **Erwin Schrödinger Lecture**

Friday, September 23, 2011 - 5 p.m. Boltzmann Lecture Hall, ESI, Boltzmanngasse 9, Vienna

## Arthur Jaffe (Harvard University): Physics and Mathematics of Quantum Fields

Quantum fields provide a natural way to combine Schrödinger's quantum theory with Einstein's relativity. This physics hypothesis, originally proposed in the 1940's, has been refined over the intervening years. It results in the most accurate agreement between predictive calculations and observation known on earth—agreement to unbelievable precision. Furthermore deep conceptual understanding of physics has emerged. But unlike all earlier theories of physics, quantum fields have not yet been understood within a logical (mathematical) framework. In particular one has not yet found a mathematically-complete field theory example that is relevant for a four-dimensional world. In this talk we review progress on the mathematical understanding of quantum fields, explain some recent insights, and underscore some important open problems.

**Arthur Jaffe** is the founder of the subject of constructive quantum field theory together with James Glimm. He has made seminal contributions to many related fields of mathematics and physics and is a recipient of the Dannie Heinemann Prize in Mathematical Physics. Arthur Jaffe has been President of the American Mathematical Society and the International Association of Mathematical Physics and was the Founding Director of the Clay Mathematics Institute. He is the L.T. Clay Professor of Mathematics and Theoretical Science at Harvard University.

The Erwin Schrödinger Lectures are directed towards a general audience of mathematicians and physicists. In particular it is an intention of theses lectures to inform non-specalists and graduate students about recent developments and results in some area of mathematics or mathematical physics.

The lecture will be followed by an informal reception.