

School of Physics & Astronomy jointly
with the School of Mathematics

Stoner Colloquium



UNIVERSITY OF LEEDS

“TOPOLOGY AND QUANTUM PHYSICS”

**Sir Michael Atiyah,
University of Edinburgh**

Tuesday 9th February 2010

5.15-6.15pm,

Rupert Beckett Lecture Theatre, Michael Sadler Building

ABSTRACT

Classical Physics has a long and intimate relation with Geometry, going back to Galileo and Newton, in which force bends (or curves) the motion of a particle. This broad idea carries over to Maxwell's Electromagnetism and Einstein's General Relativity. However in the 20th century quantum mechanics altered the picture, but at the same time geometers widened their horizons by taking up topology. I will try to explain how the force- curvature link extends to a quantum-topology one.

Interestingly a prime example of a topological problem is that of distinguishing knots, and Kelvin in the 1870's suggested that knots might explain the structure of atoms. Although, with the advent of quantum mechanics, Kelvin's theory was discarded, it was too beautiful an idea to waste. In a sense Kelvin's basic idea has survived but applied at the subatomic level.

The new understanding of the Quantum –Topology link has had a profound effect on both mathematics and theoretical physics, as I hope to indicate.

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