



## **Our Dynamic Sun (Hannes Alfvén Medal Lecture)**

Eric Priest

University of St. Andrews, United Kingdom

The Sun, an object of worship for early civilisations, is the main source of light and life on Earth and of our space weather, with many subtle effects on our environment.

The lecture will introduce you to the Sun and its dynamic phenomena, and will aim to show how our understanding of many aspects of the Sun has been revolutionized over the past few years by current spacecraft observations and models. Much of the dynamic behaviour is driven by the magnetic field since, in the outer atmosphere (or corona), it represents by far the largest source of energy.

The interior of the Sun, revealed by solar seismology, possesses a strong shear layer at the base of the convection zone, where sunspot magnetic fields are generated. But a small-scale dynamo is also operating near the surface of the Sun, generating magnetic fields that thread the lowest layer of the solar atmosphere, the photosphere, in a turbulent convective state. Above the photosphere lies the highly dynamic fine-scale chromosphere and beyond that the rare corona at high temperatures exceeding one million degrees K. Magnetic mechanisms for heating the corona (an intriguing puzzle) will be described.

Other puzzles include the structure of giant flux ropes, known as prominences, which have complex fine structure. Occasionally, they erupt and produce huge ejections of mass and magnetic field (coronal mass ejections), which can disrupt the space environment of the Earth. When such eruptions originate in active regions around sunspots, they are also associated with solar flares, where magnetic energy is converted to kinetic, heat and fast particle energy. A new theory will be presented for the origin of the twist that is observed in erupting prominences.