UNIVERSITY OF LEEDS

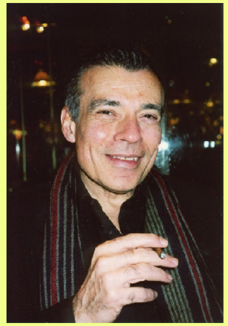
Physics Colloquium

Thursday, 29 November 2007,
Chemistry Lecture Theatre A

15:00

Arthur Miller
University College London

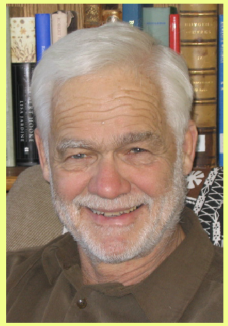
Empire of the Stars: Obsession, Friendship and Betrayal in the Quest for Black Holes



16:00

Michael Nauenberg
University of California, Santa Cruz

E.C. Stoner's pioneering work on white dwarf stars



Prof Arthur I Miller, History and Philosophy of Science, University College London

Empire of the Stars: Obsession, Friendship and Betrayal in the Quest for Black Holes

Prof Miller tells the story of how in August 1930, on a voyage from Madras to London, the young Indian physicist Subrahmanyan Chandrasekhar calculated that certain stars would suffer a violent death, collapsing virtually to nothing. This extraordinary claim, the first mathematical description of black holes, rankled one of the greatest astrophysicists of the day, Sir Arthur Eddington. When Chandrasekhar expounded his theory in front of the assembled great and good of the Royal Astronomical Society in 1935, Eddington subjected him to humiliating public ridicule, thereby setting into motion one of the greatest scientific feuds of the twentieth century and hindering the progress of astrophysics for nearly forty years.

Prof Michael Nauenberg, Physics, University of California, Santa Cruz

E.C. Stoner’s pioneering work on white dwarfs

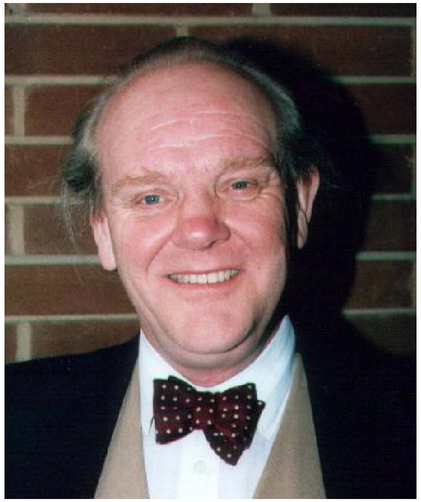
The existence of a mass limit for white dwarfs is usually attibuted solely to S. Chandrasekhar, and this limit is now named after him. But as is often the case, the history of this discovery is more nuanced. Actually, the existence of a maximum mass was first established by Edmund C. Stoner, who a few years earlier had played an important role in Pauli’s formulation of the exclusion principle in quantum physics. Stoner’s interest in dense stars was aroused by Ralph Fowler’s application of this principle to solve the puzzle of the origin of the extremely high density of white dwarfs, which could not be explained by classical physics. Subsequently, Stoner developed a novel minimum energy principle to determine the equilibrium properties of such dense stars, and after obtaining the relativistic equation of state of a degenerate (zero temperature) electron gas for arbitrary densities, he discovered the white dwarf mass limit.

UNIVERSITY OF LEEDS

Bolton Lecture 2007

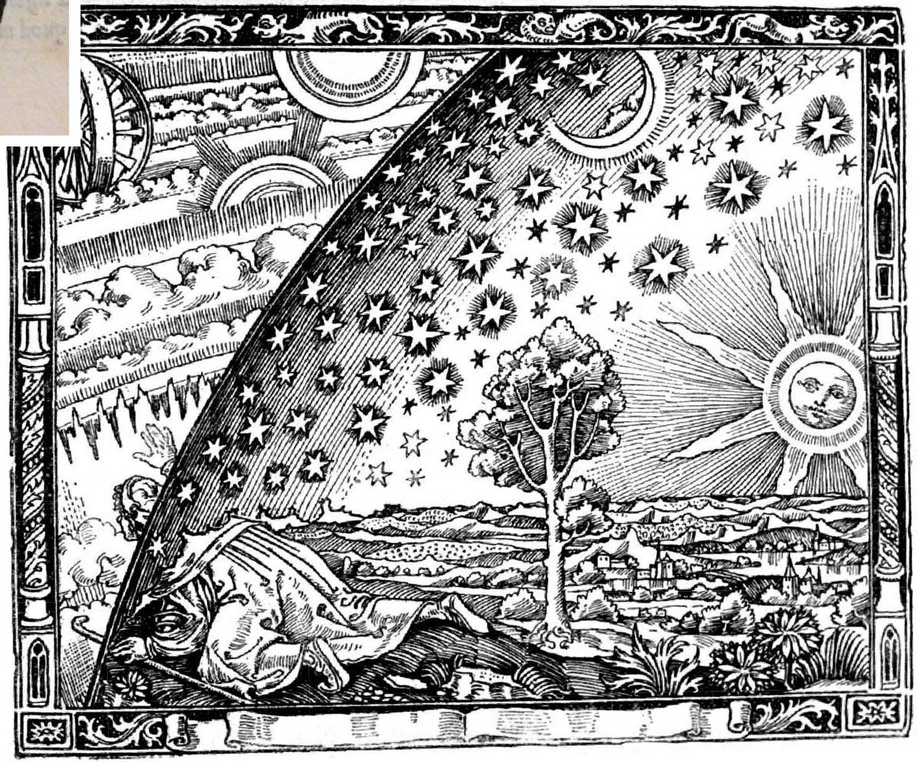
Friday, 30 November 2007, 17:00

Rupert Beckett Lecture Theatre



Allan Chapman
Faculty of History
University of Oxford

Reaching through the Stars: Astronomy and Cosmology in Medieval Europe



Dr Allan Chapman, Faculty of History, University of Oxford

Reaching through the Stars: Astronomy and Cosmology in Medieval Europe.

According to popular mythology, medieval people thought that Earth was flat, and that anyone who took an interest in science risked getting burned at the stake. Yet the absurdity of this view becomes obvious when one looks at original medieval documents.

For astronomy was actively taught in the Universities across Medieval Europe, and was firmly grounded (as was the astronomy of the medieval Arabs) in the writings of classical Greece. And by the time that John of the Holy Wood (Johannes de Sacrobosco) - who is said to have been born in Halifax - wrote his influential textbook “The Sphere of the World” around 1240, all the modern arguments for a spherical Earth, the causes of eclipses and the planetary periods were firmly in place. For while it is true that Sacrobosco‘s book took it as read that the Earth was fixed in the centre of the Universe, as both common sense and available mathematical logic then argued, his approach to astronomy was logical, rational and mathematical.

But in addition to continuing a tradition of Greek astronomy, medieval cosmologists and scientists touched upon all sorts of modern-sounding topics. For instance, were time and space absolute or relative? Could an infinitely powerful God have created an infinite Universe, or even an infinity of Universes, had he chosen to do so? What was the source of motion, and is motion finite or relative? Do the same physical forces which act upon Earth, also act upon the stars and planets? Is it more economical for the Earth to spin once per day upon its axis, rather than have the entire Universe spin around us? Could there be creatures living on other worlds?

In their great fascination with light, moreover, medieval scientists laid down the first experimentally derived laws of optics, while the Benedictine Monk, Richard of Wallingford, designed and built a great astronomical clock around 1326 which not only simulated the motions of the heavens by machinery, but even used elliptical gears to replicate certain planetary orbits.

And contrary to popular mythology, no one got burnt at the stake because of these ideas. In fact, the vast majority of medieval astronomers were Churchmen of eminence, and Thomas Bradwardine - who was fascinated by infinity - went on to become Archbishop of Canterbury.

In addition to dispelling myths, this lecture will attempt to explore the enormous richness of medieval astronomical and cosmological thought, which in many cases touched for the first time upon ideas later taken up and developed by Copernicus, Kepler, Newton and even Einstein.