

“Active Galaxies”
Professor Ian McHardy
Southampton University

Professor McHardy explained the background and current understanding of active galaxies or active galactic nuclei (AGN) since the first explanation of their existence in the mid-fifties. The development of new telescopic techniques, from optical to X-ray, infra-red etc and particularly the Hubble space telescope has led to a greater understanding of AGN's and the mechanisms which power them.

Active galaxies emit more energy than would be expected from the sum of emissions from each of the stars found in the galaxy. The most common explanation assumes that they are powered by accretion onto massive black holes (between 100 and 1000 times the mass of our sun) at the centre of the AGN. This in turn releases large amounts of gravitational energy which is emitted in the infra-red, UV, infra-red and X-ray regions of the electromagnetic spectrum.

Professor McHardy described several types of active galaxies including Seyferts, quasars and blazars but many scientists believe that, even though these types look very different to us, they are really all the same thing viewed from different directions. Photographs show exceptionally bright centres sometimes accompanied by bright jets of hot plasma.

Seyfert galaxies are much closer to us than quasars or blazars and were first observed in the 1940's using optical telescopes. They are characterized by having small, bright nuclei (optical) and strong emission lines in their optical spectrum. Quasars are active galaxies which are the farthest away from us – as far as 12 billion light years. Blazars are very bright in the radio band, which results from looking directly down a jet which is emitting in synchrotron radiation.

Professor McHardy explained that the on-going study of AGNs is providing greater insights into how the universe was formed and how it functions.

Given on Wednesday 14th November 2012 at the Royal Agricultural College