

TEXT OF THE INTRODUCTORY ADDRESS delivered by: **PROFESSOR GERARD T. WRIXON**, Pro-Vice-Chancellor, President, University College Cork – National University of Ireland, Cork, on 4 June 2004 in University College Cork – National University of Ireland, Cork, on the occasion of the conferring of the Degree of Doctor of Science, *honoris causa*, on **ROBERT W. WILSON**

A Sheánsailéar, a mhuintir na hOllscoile agus a dhaoine uaisle,

Of all the sciences, astronomy probably attracts the greatest public interest. Indeed, it can be regarded as the oldest of the sciences: many ancient relics and monuments - including many here in Ireland - bear a lasting testimony to this. The ancients had an intuitive connection with the Cosmos, as if somehow anticipating, for example, the now established fact that most of the elements from which we are made originated in the cores of massive stars.

The spell cast by astronomy on the public imagination is well known: for example, astronomy related degrees are now being used by many Irish universities to attract bright and motivated students to the sciences - indeed, UCC was the first to offer such a degree. To quote Einstein - "The most incomprehensible fact about the universe is that it is comprehensible." Astronomy asks the most fundamental questions: Do black holes exist? Are there planets orbiting other stars? How will the universe evolve? How has it done so in the past?

It is in answer to the last question that the work of our celebrated guest today, Dr Robert Wilson of the Harvard-Smithsonian Centre for Astrophysics, has played the central role. To better appreciate this, let me tell you briefly about the status of our understanding of the universe in the late 1950's and early '60's...

Back then, there were two theories to the origin of the universe. The "Steady State" theory, proposed by the likes of Fred Hoyle, maintained that the universe has no beginning or end and that, as the universe expands, matter is spontaneously created to maintain the constant density of the universe.

According to the opposing theory, propounded by George Gamow and others, the universe **had** an origin at a moment in time, and everything we observe today originated from an incredibly dense and hot cataclysmic event astronomers call "the Big Bang." High temperature radiation would have permeated the universe at this time.

Which theory was correct ? The answer was provided by Arno Penzias and Robert Wilson in 1965, while they were working for Bell Labs in the US.

They had been using a large microwave antenna to study radio emission from our Galaxy when they found an unexpected background of radio emission with no obvious explanation. It came from all directions in the sky, and, after repeated checks - including the removal of pigeons and their "deposits" from the antenna (!) - Penzias and Wilson became convinced that the emission emanated from outside our Galaxy. After consultation with physicists from Princeton University, they finally realized that the mysterious radio signal was cosmic radiation that had survived from the very early days of the universe. It was in fact proof of the "Big Bang".

The measurement of this "Cosmic Microwave Background" is in complete agreement with the "Big Bang" theory: this has been called by some as the most important

achievement in astronomy since Hubble's discovery of the expansion of the universe. It moved the idea of the "Big Bang" from the realm of theoretical speculation to experimental fact. For their discovery of the Cosmic microwave background, Penzias and Wilson were awarded the Nobel Prize in Physics in 1978.

Bob Wilson has made many other important contributions to astronomy since. With Penzias and co-workers he discovered the existence of deuterium (heavy hydrogen) in interstellar space. This is one of the few elements not generated in large quantities in stars, and hence must have been created when the universe was young and hot - not long after the "Big Bang" itself. Bob also played a significant role in the discovery of molecules in space, which has important implications for the formation of stars and the chemistry of interstellar material.

Nowadays, Bob is closely involved with the construction of the so-called "Submillimeter Array" located near the summit of Mauna Kea in Hawaii. From here, this new facility is expected to make important contributions to our understanding of Solar System bodies, young stars and planetary formation in our Galaxy, and star formation in distant galaxies.

In conclusion: it is hard not to be envious of a life so richly endowed with scientific discovery. We congratulate Bob on his many contributions to astronomy over the years, and we are privileged to be able to celebrate his many accomplishments here today.

PRAEHONORABILIS CANCELLARIE, TOTAQUE UNIVERSITAS:

Praesento vobis hunc meum filium, quem scio tam moribus quam doctrina habilem et idoneum esse qui admittatur, honoris causa, ad gradum Doctoratus in Scientia, idque tibi fide mea testor ac spondeo, totique Academiae.