



European Astronomical Society 2012 Lodewijk Woltjer Lecture

The European Astronomical Society 2012 Lodewijk Woltjer Lecture is awarded to Professor Wolfgang Hillebrandt for his fundamental contributions to the study of supernova explosions.

The Lodewijk Woltjer Lecture honours astronomers of outstanding scientific distinction.

Supernovae, the spectacular brightening of a star that can appear almost as bright as its parent galaxy, have fascinated physicists and astronomers for many decades or even centuries. It was suggested in the 1930s that supernovae could be the transition between a normal star and a neutron star, implying that the source of energy is gravitational. In the intervening time, it was also suggested that explosive nuclear reactions could be at the origin of the supernova phenomenon. It is now clear that both explosion mechanisms are at work, albeit in different types of supernovae. Those of type Ia are due to thermonuclear disruption of white dwarfs. Those of type II to the collapse of the core of massive stars.

These basic facts established, also with contributions of Hillebrandt and his team, it remains necessary to understand the physics at work. Core collapse leads to the implosion of the star, while it is an explosion that is observed. For many years, models of supernovae have failed to describe these explosions. Hillebrandt and his team have little by little incorporated many physical processes, like for example the interactions of neutrinos with stellar matter, in models of pre-supernova stars and are thus now becoming capable of following the star from the collapse of its core to the explosion of the outer layers. Similarly The work of Hillebrandt and his group is leading to a detailed understanding of the thermonuclear disruption of white dwarfs.

While understanding the physics of supernovae is a major achievement per se, it is also a major building block for the understanding of the evolution of galaxies and the Universe. Not only are supernovae of type Ia standard candles that allow us to “measure” the



Figure 1: Wolfgang Hillebrandt

Universe, but all supernovae synthesise new elements and disperse the product of nucleosynthesis in their surroundings. They are thus an essential element in the long chain of events that leads to life. Hillebrandt and his team have contributed key elements to this subject.

Wolfgang Hillebrandt was born in 1944. He studied physics and mathematics at the University of Cologne where he obtained his PhD in 1973. After some time at Caltech in California and some at the Technical University of Darmstadt, he joined the Max Planck Institute for Physics and Astrophysics in Munich in 1978 and then Garching, where he became director. He is Honorary Professor at the Technische Universität München.

The European Astronomical Society (EAS) promotes and advances astronomy in Europe. As an independent body, the EAS is able to act on matters that need to be handled at a European level on behalf of the European astronomical community.

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