

## Preface

IAU Colloquium 185, entitled “Radial and Nonradial Pulsations as Probes of Stellar Physics” was organised by the Institute of Astronomy of the Catholic University of Leuven. It took place on 26 — 31 July 2001. The venue of the meeting was the main lecture hall of the university in the city center of Leuven. The 215 participants from 33 countries worldwide were welcomed by Prof. Guido Langouche, vice-president of the group of exact sciences of the university. He summarised the main highlights of the history of the university, which had existed for 525 years at the time of the colloquium.

The meeting was dedicated to the scientific achievements of two Belgian Pauls, both pioneers in the theoretical research on stellar oscillations: Paul Ledoux (1914–1988, Université de Liège) and his former PhD student Paul Smeyers (born 1934, Katholieke Universiteit Leuven). The idea of using non-radial pulsations to probe stellar interiors was introduced by Paul Ledoux in a seminal paper in *Astrophysical Journal* published in 1951 (and hence almost exactly 50 years before the time of the meeting). This paper initiated the research domain which is nowadays termed “asteroseismology”. Paul Ledoux laid the foundation of the theory of the hydrodynamics of stellar oscillations and stellar stability. Much of his work is still in use today. Paul Smeyers contributed significantly in many different areas of theoretical studies of stellar oscillations. He was honoured during the colloquium on the occasion of his recent retirement.

The meeting was sponsored by the International Astronomical Union (IAU) and the Fund for Scientific Research of Flanders (FWO)<sup>1</sup>. Their financial support is gratefully acknowledged. The meeting was proposed as an IAU colloquium by Commission 27 of Division V (Variable Stars) of the IAU, and was supported by five other IAU commissions, viz. 25 (Stellar Photometry & Polarimetry), 29 (Stellar Spectra), 30 (Radial Velocities), 35 (Stellar Constitution), 36 (Theory of stellar atmospheres). The colloquium was the latest in a series of biennial meetings in the research domain of pulsating stars. Previous meetings in the series were held in Budapest (1999), Los Alamos (1997), and Cape Town (1995).

The colloquium highlighted the importance of pulsating stars as probes of the internal properties of stars. It is still not clear today how important phenomena such as convective energy transport, convective overshooting, internal rotational mixing, non-linear dynamics, non-linear mode-coupling, stochastic processes etc., are to obtaining a good description of the structure and the evolution of a star. Pulsating stars offer a unique way to study these phenomena through the technique of asteroseismology. As became clear during the conference, there is much recent progress within this area and this will undoubtedly continue in the coming decade as 8m-class telescopes will soon be used to obtain

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<sup>1</sup>In particular, this meeting was sponsored by the Flemish Minister of Education and Cultivation in the framework of a specific action to highlight the scientific research in Flanders throughout the world.

high temporal- and spatial-resolution spectra, and moreover several dedicated space missions are in full preparation for launch within 3 years from now. The numerous participants in the meeting and the impressive number of presentations as oral talks and posters gathered in this book are strong indications of the growing interest in stellar pulsation studies.

The scientific and local organising committees consisted of the following people :

<b>Scientific Organising Committee:</b>	<b>Local Organising Committee:</b>
Conny Aerts (Belgium)	Conny Aerts (chairwoman, Leuven)
Tim Bedding (Australia)	Arlette Noels (Liège)
Mike Breger (Austria)	Chris Sterken (Brussels)
Jørgen Christensen-Dalsgaard (chairman, Denmark)	Tim Van Hoolst (Leuven)
Wojciech Dziembowski (Poland)	Christoffel Waelkens (Leuven)
Joyce Guzik (USA)	Bart Willems (Open University, UK)
Steve Kawaler (USA)	
Eric Michel (France)	
Ennio Poretti (Italy)	
Dimitar Sasselov (USA)	
Hiromoto Shibahashi (Japan)	
Mike Thompson (UK)	
Patricia Whitelock (South Africa)	

The SOC and LOC would like to thank explicitly Bart Willems for the development and maintenance of the colloquium web page, Bart Vandebussche for his continuous and very professional guidance with respect to the computer presentations, and Katrien Kolenberg for her personal artistic writing of the badges. An acknowledgement of all the young researchers of the Institute of Astronomy of the University of Leuven who have done an enormous effort to help in the practical organisation during the meeting is also highly appropriate. The editors are much indebted to Anette Skovgaard for her help with the manuscripts and to Saul Adelman, Joyce Guzik and Stan Owocki, who kindly provided the pictures included in this volume. Finally, Don Kurtz is gratefully acknowledged for accepting the very hard job of reviewing the highlights of the conference during the closing lecture and for doing it so well.

*December 2001,*

*C. Aerts, T.R. Bedding and J. Christensen-Dalsgaard,  
editors*

The cover illustration including “Fonske” was designed by Bart Willems and Conny Aerts