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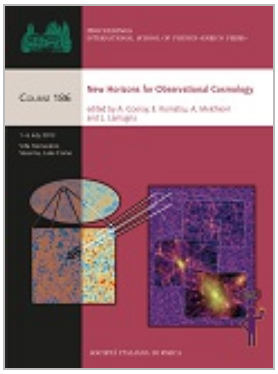
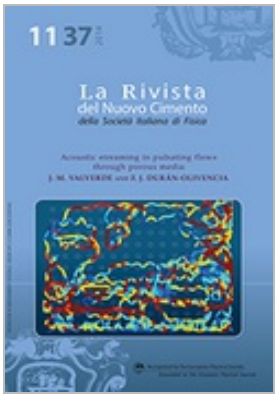
Proceedings of the International School of Physics "Enrico Fermi" – Course 186
New Horizons for Observational Cosmology



edited by *A. Cooray, E. Komatsu, A. Melchiorri, L. Lamagna*
Our understanding of the universe has been revolutionized by observations of the cosmic microwave background, the large-scale structure of the universe, and distant supernovae. These studies have shown that we are living in a strange universe: 96% of the present-day energy density of the universe is dominated by the so-called dark matter and dark energy. But we still do not know what dark matter and dark energy actually are. The data also suggest that it is likely that the universe underwent a rapid accelerating expansion phase in the very early universe called the inflationary phase. However, we still do not know how inflation happened. These fascinating topics, and other related subjects, are treated in the lectures of the Course "New Horizons for Observational Cosmology", held in Varenna, Italy, in July 2013. The anticipated release of Planck data at the end of 2014 will undoubtedly address fundamental questions about the universe. This book prepares the ground for future work which may answer some of these exciting questions.

La Rivista del Nuovo Cimento, Vol. 37, N. 11 (2014)
Acoustic streaming in pulsating flows through porous media



J. M. Valverde and *F. J. Durán-Olivencia*
The acoustic streaming phenomenon is responsible for notable enhancement of heat, mass and momentum transfer and takes place in processes involving two phases subjected to relative oscillations. Understanding the fundamental mechanisms governing acoustic streaming in two-phase flows is of interest for applications like sonoprocessed fluidized bed reactors, thermoacoustic refrigerators/engines, pulsatile flows through veins/arteries, hemodialysis devices, pipes in off-shore platforms and piers, vibrating structures in the power-generating industry, lab-on-a-chip microfluidics and microgravity acoustic levitation, solar thermal collectors, etc. The fundamental physics behind acoustic streaming in porous media is highlighted to provide a simple instrument to assess the relevance of this phenomenon in each application.

EPJE – Recent Highlights

Dew condensation on desert beetle skin

J. M. Guadarrama-Cetina, A. Mongruel, M.-G. Medici, E. Baquero, A. R. Parker, I. Milimouk-Melnytchuk, W. González-Viñas, and *D. Beysens*

Insects are full of marvels – and this is certainly the case with a beetle from the Tenebrionind family, found in the extreme conditions of the Namib desert. Now, a team of scientists has demonstrated that such insects can collect dew on their backs – and not just fog as previously thought. This is made possible by the wax nanostructure on the surface of the beetle's elytra. These findings were recently published in EPJE. They bring us a step closer to harvesting dew to make drinking water from the humidity in the air. This can be hopefully done by improving the water yield of man-made dew condensers that mimick the nanostructure on the beetle's back.

Perspectives: A new flavour for Premium articles

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A strong motivation to start the Perspective series came from the UN declaration of 2015 as the International Year of Light (IYL).

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