- The seeds of structure: A view of the Cosmic Microwave Background, Joseph Silk
- The shape of the universe as seen by Planck, Enrique Martínez-González
- Deciphering the beginnings of the universe with CMB polarization, Matías Zaldarriaga
- 30 years of Cosmic Microwave Background experiments in Tenerife: From temperature to polarization maps, Rafael Rebolo
- Cosmology from Planck: Do we need a new Physics?, Nazzareno Mandolesi

The seeds of structure: A view of the Cosmic Microwave Background, Joseph Silk

One of our greatest challenges is understanding the origin of the structure of the universe.I will describe how the fossil radiation from the beginning of the universe, the cosmic microwave background, has provided a window for probing the initial conditions from which structure evolved. Infinitesimal variations in temperature on the sky, first discovered in 1992, provide the fossil fluctuations that seeded the formation of the galaxies. The cosmic microwave background radiation has now been mapped with ground-based, balloon-borne and satellite telescopes. These provide the basis for our current ``precision cosmology'' in which the universe not only contains Dark Matter but also ``DarkEnergy'', which has accelerated its expansion exponentially in the last 4 billion years. I will give an overview of its current status and future challenges.

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The shape of the universe as seen by Planck, Enrique Martínez-González

I will review recent results on the shape of the universe derived from the Cosmic Microwave Background data provided by the ESA Planck mission.
These results inform us, in particular, about the geometry of the universe and its global topology as well as about the matter distribution.
As it will be shown, most of our findings fit well with a relatively simple model of the universe.
The bases of some of its main characteristics were established several hundred years ago after the Copernican revolution.
Although this simple model can explain most of the data, however some anomalies have been also found that may indicate possible deviations from it.

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Deciphering the beginnings of the universe with CMB polarization, Matías Zaldarriaga

I will discuss how measurements of the polarization of the cosmic microwave background can be used to study the earliest instants in the history of our Universe. I will summarize the latests observational results from the BICEP2 and Planck collaborations.

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30 years of Cosmic Microwave Background experiments in Tenerife: From temperature to polarization maps, Rafael Rebolo

Since 1984 a series of experiments have been conducted at Teide Observatory (Tenerife) with the aim to study the anisotropy of the Cosmic Microwave Background (CMB). These studies started with the so-called Tenerife experiment, one of the first to confirm the level of anisotropy in the CMB detected by the COBE satellite in 1992. It was followed by interferometric experiments (VSA) that led to pioneer measurements of the acoustic peaks in the CMB angular power spectrum and by fast modulation experiments (COSMOSOMAS) which provided an unambiguous detection of Anomalous Microwave Emission in molecular clouds of our Galaxy. Nowadays, the effort is focused on the QUIJOTE experiment, which consists of two microwave telescopes of 2.3 m dedicated to the measurement of the polarization of the CMB. I will describe this experiment which will obtain maps of large sky regions at six microwave frequencies with sufficient sensitivity to characterise foreground emission and disentangle the cosmological B-modes if the tensor to scalar ratio were of order 5% or larger

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Simposio Internacional: La radiación del Fondo Cósmico de Microondas: mensajera de los orígenes del universo

International Symposium**: **CMB Radiation: Messenger of the Origins of Our Universe

Madrid, 6 de noviembre de 2014
Madrid, November 6, 2014

Cosmology from Planck: Do we need a new Physics?,Nazzareno Mandolesi

I will review a few highlights from the Planck 2013 cosmological release, including our findings on the Hubble constant, the CMB weak lensing and neutrino mass and species number, in the framework of the □CDM model. I will discuss expectations from the imminent Planck 2014 polarized data release, which includes a Planck-Bicep2 joint effort. Finally, I will present the case for possible non standard extensions of the standard model arising from violations of fundamental symmetries. These are investigated through the CMB because they can induce cosmological birefringence, and represent one of the most promising avenues for new physics.

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