Summary

Control of light frequency correlations. p. 4

Ferran Macià

This paper describes the light correlation of photon pairs generated in a spontaneous parametric down-conversion process (SPDC). We propose two methods to control the state of the resulting photon pairs without using the conventional crystal-length or material parameters. The first method is based on tilt pulses and can be implemented in several materials and for unusual frequency bands. The second method consists of modulating the non-linear coefficient of the crystal. In this case, the results differ from those given by the previous technique because we are engineering the crystal function. In any case, both techniques allow control of the correlation and the amount of entanglement of the photon pair states.

The 2006 Nobel Prize in Physics: the cosmic background radiation again p. 15

Eduard Salvador

The 2006 Nobel Prize in Physics was awarded to two astrophysicists, John Mather and George Smoot, for the discovery of the shape of black bodies and the anisotropy of cosmic background radiation. This is the second time in history that contributions in this field have merited such a distinguished award. On the first occasion, the prize was awarded for the discovery of background radiation. The second prize has now recognized the detailed characterization of its properties. These properties fully confirm the Big Bang model, according to which the universe had a beginning in time.

A new detector for dynamic experiments with synchrotron light. p. 30

I. Ramos-Lerate, F. Fernández, J. C. Martínez, D. Beltrán i B. Saló

This paper reviews the X-ray detection systems used in synchrotron light sources. The design and development of an X-ray detection system to carry out diffraction/scattering experiments in the sub-millisecond time scale is also presented.

Description of an index for the comparison of distributions, with applications in medical physics. p. 37

Jaume Quera, Martí Lacruz, Manuel Algara, Núria Anton i Enric Fernández-Velilla

Medical Physics is a health specialty whose fundamental objectives are quality assurance of radiation units and dosimetrical planning of radiotherapy treatments. Both objectives are closely related to the analysis of dose distributions, obtained from experimental procedures or calculated by mathematical algorithms. The article presents a quantitative index (modified gamma), which allows the analysis to be performed rapidly and reliably.