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Annus mirabilis

By Paola Lizares



Look at the picture above. Do you recognise the boy with the rather tacky seaside background behind him? Add some wrinkles, a white moustache and messy white hair, and you've got him: Albert Einstein.

Albert Einstein has been the talk of the town this year, the World Year of Physics 2005. All around the world, there have been exhibits, congresses and ceremonies to commemorate the 100th anniversary of Einstein's *Annus mirabilis*.

Annus mirabilis is the Latin for 'year of wonders'. Indeed, 1905 was a year of wonders for Einstein and the whole scientific community. That year, Einstein published four revolutionary papers. The first paper explained the photoelectric effect; for this paper, Einstein was awarded the 1921 Nobel Prize for Physics. The second paper studied the so-called Brownian motion. In the third paper, Einstein proposed his special theory of relativity. As for the fourth paper, it deduced the famous equation in which the energy of a body at rest (E) equals its mass (m) times the speed of light (c) squared.

As mentioned above, the third *Annus mirabilis* paper proposed the special theory of relativity. This theory is not to be confused with the general theory of relativity that Einstein published ten years later, on December 2nd, 1915. So today, December 2nd, 2005 commemorates the 90th anniversary of the publication of Einstein's world-famous general theory of relativity. Surely there will be another year of celebrations in 2015.

It is difficult to fully understand Einstein's theories without a decent knowledge of physics and mathematics. But lay people like you and me can at least realise how present Einstein is in everyday life (whether for good or for bad).

For example, Einstein indirectly contributed to the Global Positioning System, more commonly known as the GPS. In his general theory of relativity, Einstein proposed that space is curved. If it weren't for his ideas about the curvature of space, scientists nowadays wouldn't be able to measure locations on Earth accurately.

Or, to give you another example, while researching the photoelectric effect, Einstein discovered stimulated emission, a phenomenon in which matter, when perturbed by a photon, could lose energy, creating another photon. In the sixties, stimulated emission was used to generate beams of light by means of an optical device called Light Amplification by Stimulated Emission of Radiation, more commonly known by its acronym LASER. Nowadays, lasers are found in a whole variety of applications: CD and DVD players, laser printers, barcode readers, surgery techniques, laser pointers, etc. And all because of Albert Einstein.

However, Einstein is also present in everyday life in something much more polemic: nuclear energy. During World War II, he was in favour of the USA constructing the atomic bomb to assure that Hitler did not do so first. But after the war, Einstein lobbied for nuclear disarmament and for a world government: "*I know not with what weapons World War III will be fought, but World War IV will be fought with sticks and stones.*"

Personally speaking, I appreciate Einstein not so much because of his brilliant contribution to science but because he was a promoter of pacifism and humanitarianism. The year 2005 is coming to an end and, in my opinion, it has been more like an *annus horribilis* than like an *annus mirabilis*. Wars, terrorism, natural catastrophes, illness, strife, injustice... Let's see what kind of year next year will be.

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