The new millennium began with the widespread introduction of the smallest, most robust, fast and economic light source that technology has ever produced, the Light Emitting Diode (LED). Once again, the actors in the scene are semiconductors, materials that previously revolutionized electronics. And it is thanks to them that scientists managed to produce light at very low energy consumption, compared to conventional light sources. After candles, incandescent light bulbs and fluorescent lighting, LEDs are the fourth illumination technology.

How does a LED work? LEDs are extremely tiny light bulbs, easy to fit into an electrical circuit. They don’t produce light by heating a filament; this is why they don’t get hot. Instead, light is produced just by the motion of electrons in a semiconductor material, like in standard transistors. According to quantum theory, electrons that fall into a lower energy level, release energy in the form of light particles, called photons.

LEDs have many advantages over other light sources: lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. That’s why in the last decade we moved into a LED-centric world, with LEDs used in many applications such as car headlights, advertising displays, TV screens, general home and industrial lighting, traffic signals, camera flashes, and lighted wallpaper.

What can we expect from the future? Probably a wireless lighting revolution. But this has yet to come!