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Carbon nanostructures for directional light dark matter detection

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Carbon nanostructures offer exciting new possibilities in the detection of light dark matter. A dark matter particle with mass between 1 MeV and 1 GeV scattering off an electron in the Carbon lattice would transfer sufficient energy to eject the electron from the surface. In aligned Carbon nanotubes the ejected electron travels along the tube axis without being reabsorbed, and exits the carbon target, where it is accelerated by an external electric field, and detected by a single-electron detector. We report on the latest results in the development of a prototype based on this concept built at the University of Rome Sapienza and INFN Roma in the framework of the PTOLEMY collaboration. This same concept is applied to the field of UV light detection, in which detectors with photocathodes made of aligned nanotubes have the potential of drastically reducing photoelectron reabsorption, which is the leading cause of inefficiency in modern UV light detectors.

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Secondary track (number)

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