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Quantum Sensors of the Dark Universe: Exploiting Quantum Entanglement in the Laboratory for Detection of Exotic Particles and Fields

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Our immediate familiar natural world as well as the universe beyond, are "quantum-entangled" from the microscopic to the macroscopic scale, from the "inner" to the "outer" dimensions. This fundamental "quantum entanglement" can be harnessed to sense and probe extremely "weak" processes in nature around us, to create novel materials and to probe and sense signals left over from the very "early" and "dark" universe, allowing us to be 'cosmic archaeologists'. After an exposition of the basics, I will illustrate "quantum entanglement"at work via its manifestation and controlled exploitation in the world of particles, fields, cosmos, novel quantum topological materials in the detection of exotic particles and fields.

Secondary track (number)

09

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