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Quantum-dot light emitters for chromatic calorimetry

Quantum technologies are establishing themselves relentlessly in a wide spectrum of applications, ranging from quantum computing, communication, simulation to imaging and sensing.
In the context of the ECFA Detector R&D roadmap process, many physics targets have been identified that could benefit from the unprecedented sensitivity and precision of quantum systems. In particular, materials based on semiconductor nanomaterials such as CdSe, InGaN/GaN or perovskite nanocrystals are being studied as scintillators and for charged particle tracking detectors. Efforts exist to develop future detectors where state-of-the-art bulk scintillators are combined with visible light-emitting nanocrystals. Such innovative scintillators can reach high time resolution, which is a demanding requirement for TOF-PET applications and future HEP experiments.
In this contribution we will discuss a blue-sky development, based on the idea of a "chromatic calorimeter" made by combining state-of-the-art bulk scintillators with nanocrystals with different emitting wavelengths into a multi-layered structure, thus providing longitudinal information.

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