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Quantum Dots for Rare Decays: the ESQUIRE Project

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The future Neutrinoless Double Beta Decay (0νDBD) experiments will require a particle detector easily scalable in mass and able to reach good energy resolution (around 2% or better) in the region of interest for the study of these rare decays, at about 3 MeV.
The ESQUIRE (Experiment with Scintillating QUantum dots for Ionizing Radiation Events) project aims at the development of a new category of scintillating materials, based on nano-crystals (Quantum Dots) containing a 0νDBD candidate isotope. These scintillators would be coupled to high quantum efficiency optical photon sensors (SDDs) with high quantum efficiency (up to 80% in the 450-1000 nm λ region) and low electronic noise, thus solving in one fell swoop the scalability and the good energy resolution requests.
We will report on the first results of the optical characterization measurements of the samples containing the nano-crystals and on the first scintillation measurements collected so far.

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