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CUPID-0: the first prototype for a scintillating bolometer double beta decay experiment. (15' + 5')

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Neutrinoless Double Beta Decay is intrinsically connected with the complete characterization of neutrino properties and, if observed, implies a lepton number violation by 2 units and proves the existence of massive Majorana neutrinos. Many efforts were spent in the last few years to develop and built very high sensitive experiments increasing the detector masses, to around 1 ton, optimizing the energy resolutions and, more important, strongly reducing the radioactive backgrounds. To increase the experimental sensitivities a further reduction of spurious counts is needed moving to obtain a close to zero background experiment. To achieve such very challenging result, the proper selection of low radioactive materials needed for the detector construction must be combined with the possibility to reject large part of the experimental background. CUPID (CUORE Upgrade with Particles ID) is a proposed experiment that plan to combine the excellent energy resolution of a bolometer with the rejection capability obtainable measuring the scintillating or the Cerenkov light emitted by the absorbing crystal: a suitable scintillator must be selected in the first case and a very sensitive cryogenic light detector is needed in the second one. In this way it will be possible to reject all the signal events produced by alpha particle interactions, that is one of the most important background component in bolometric experiments. The first step for CUPID project will be the realization of the CUPID-0 tower made with around 30 ZnSe scintillating crystals, isotopically enriched in 86Se to measure its double beta decay. The experimental configuration of CUPID-0 detector, the preliminary tests on ZnSe enriched crystals and the status of some R&D programs for CUPID will be presented.

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