"Evaluation and background simulation of the XMASS experiment for the low energy neutrinos detection"

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The high sensitivity XMASS project is designed for the low energy solar neutrinos observation with the help of the liquid Xe scintillation detector with the 10 t inner fiducial volume (total mass of 23.3 t). The liquid Xe is contained in the vacuum cryostat shielded by the high purity water. The Monte Carlo simulation (with GEANT and DECAY4 codes) evidently shows that $p-p$ solar neutrino flux would be observed with the help of XMASS set up. At the same time, using 1.6 t inner volume of the detector filled with the enriched ^{136}Xe, the sensitivity of the XMASS experiment in terms of the half-life limit for the neutrinoless 2β decay of ^{136}Xe is $T_{1/2}^{0\nu} \geq 10^{27}$ yr, which corresponds to the neutrino mass constraint $m_\nu \leq 0.05$ eV. Besides, XMASS set up could promote the current bounds on the existence of dark matter particles (f. e., neutralinos) by four orders of magnitude and would be able to identify the dark matter signal by detection of its seasonal modulation.