Future prospects of experiment Neutrino-4

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for collaboration

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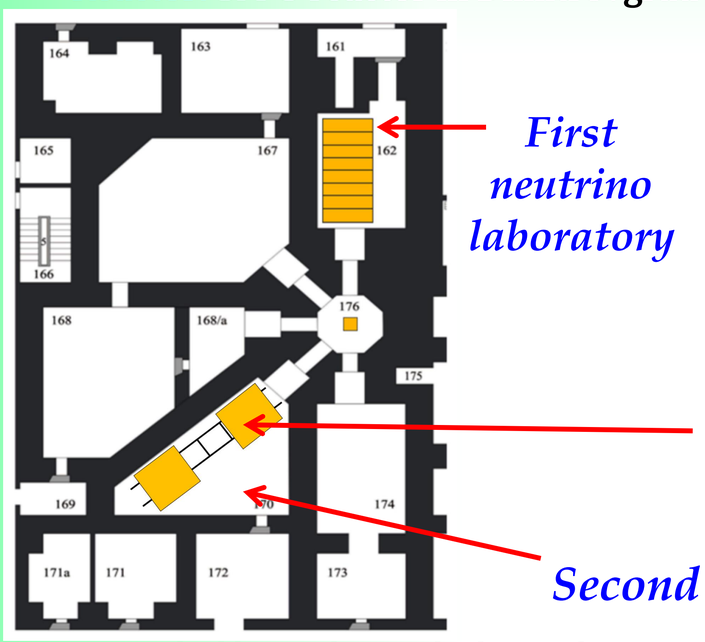
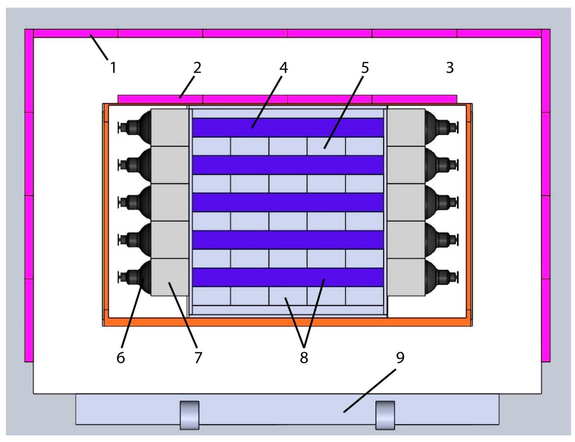
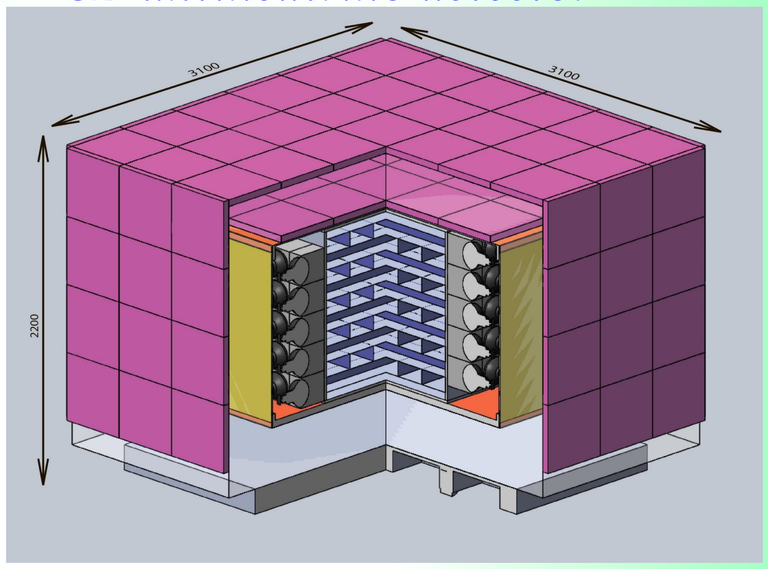
Reactor: SM-3 reactor in Dimitrovgrad (Russia): 100 MW compact core 35x42x42



New antineutrino detector

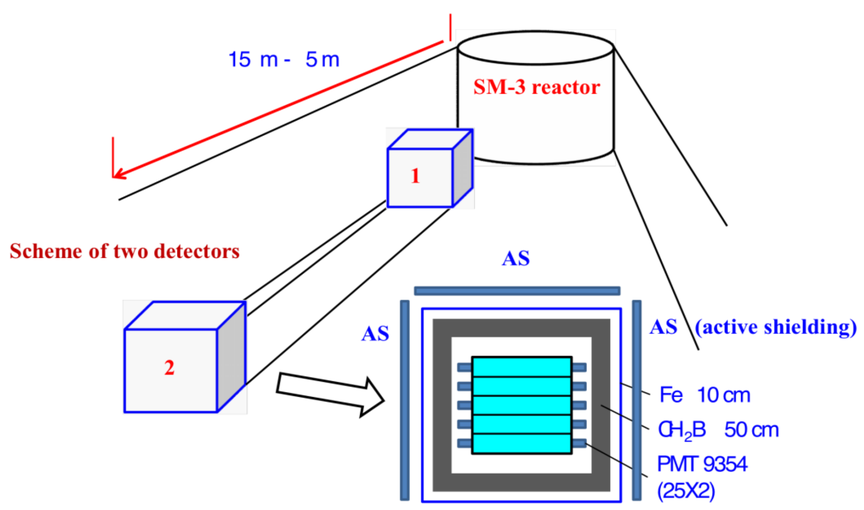


3D antineutrino detector



Location in building and general scheme of experimental setup. 1 – external active shielding, 2 – internal active shielding, 3 – borated polyethylene passive shielding, 4 – transverse section, 5 – longitudinal section, 6 – PMT-9354, 7 – gamma-catcher, 8 – scintillator, 9 – moveable platform

Neutrino laboratory on the SM-3 reactor in room №170



The future plans for Neutrino-4 experiment is to create of second laboratory with two new detectors, where the methods of suppressing the correlated background and background of accidental coincidences, which was not applied in current detector: the Pulse Shape Discrimination (PSD) method, the increasing of gadolinium concentration, using of smaller section size to improve the efficiency of positron events registration in two sections, using of two PMT for each section and using of the longitudinal and transversal sections to improve event position reconstruction. First two improvements can be applied using scintillator, produced by our colleagues from NEOS collaboration.

Using of PMT from both sides of a section and increasing in gadolinium concentration will increase total efficiency of neutrino registration by 2 times. New detectors will be equipped with internal and external active shielding will be produced with DANSS collaboration support.

Method	Factor	Relative error after 1 year of measurements with 2 detectors for each of 6 points
Initial value	--	15%
Gadolinium concentration 0.5%	**4x** acc. bg. suppression	11%
3d sectioning	**3x** acc. bg. suppression	8%
Pulse form	**5x** corr. bg. suppression	6%
Efficiency	**2x** count rate	3%

New detector section model