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TROITSK NU-MASS: from electron to sterile neutrinos

After successful 20 year long program to set an upper limit for the electron antineutrino mass the Troitsk experiment gets a new breath. Tritium beta-decay allows to search for a new physics - a possible contribution of sterile neutrinos to the electron spectrum. Sterile neutrino in keV mass range is a good candidate for the Warm Dark Matter. Our new goal is to measure beta-spectrum in the wide energy range from 10 keV to the maximum allowed energy of about 19 keV. We already performed a search for a sign of an additional neutrino mass state in the beta-electron spectrum by using old data, which were re-analyzed in the range of the last 175 eV from the spectrum end point. The lowest value at 95% C.L. upper limit for the mixing angle was found to be about or less than 0.01 for masses above 20 eV. New measurements are about to start this year. We hope to improve the existing limits by two-three orders of magnitude in the mass range up to 10 keV.

[1] A.I. Belesev et al., "An upper limit on additional neutrino mass eigenstate in 2 to 100 eV region from "Troitsk nu-mass" data", JETP Lett. 97 (2013) 67. arXiv:1211.7193

[2] A.I. Belesev et al., "A search for an additional neutrino mass eigenstate in 2 to 100 eV region from "Troitsk nu-mass" data - detailed analysis", Journal of Physics G – Nuclear and Particle Physics", 41 (2014) 015001. arXiv:1307.5687

Primary author: Dr PANTUEV, Vladislav (Institute for Nuclear Research, RAS, Moscow)

Presenter: Dr PANTUEV, Vladislav (Institute for Nuclear Research, RAS, Moscow)

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