

Separation of the U-235 and Pu-239 Prompt Energy Spectra in NEOS-II

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The NEOS aims to search for sterile neutrinos by detecting reactor antineutrinos at a very short baseline in Korea. The NEOS detector (1 ton GdLS) is deployed at the tendon gallery of the Hanbit reactor unit 5 (2.8 GW thermal power), 24 m away from the reactor core. In NEOS-I, the prompt energy spectrum from inverse-beta-decay was measured using 180 days of reactor-on data, where the “5 MeV excess” was clearly observed. To understand the origin of the “5 MeV excess”, NEOS-II has taken 500 (60) days of reactor-on(-off) data from September 2018 to October 2020, covering a whole burnup cycle of the reactor. In this talk, we present a preliminary result on the extraction of the U-235 and Pu-239 prompt energy spectra for the whole burnup cycle, which may shed light on the origin of the “5MeV excess”.

Reference to paper (DOI or arXiv)

<https://doi.org/10.1103/PhysRevLett.123.111801>; <https://doi.org/10.1038/s41567-020-0831-y>; <https://doi.org/10.1103/PhysRevLett.122.2325>
<https://doi.org/10.1103/PhysRevLett.118.121802>;

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