

## BSM Explanation of the 5 MeV Bump in the Reactor Antineutrino Spectrum

### Authorship annotation

### Session and Location

Wednesday Session, Poster Wall #150 (Hölderlin-Room)

### Abstract content

We address the 5 MeV event excess in the measured antineutrino spectrum from nuclear reactors in a beyond the Standard model framework, a challenge which has not been met to date. We employ non-standard neutrino interactions with baryons that can induce the reaction  $^{13}\text{C}(\overline{\nu}, \overline{\nu}^{\prime})n^{12}\text{C}$  in organic scintillator detectors. The de-excitation of  $^{12}\text{C}^{\prime}$  yields a prompt 5 MeV photon, while the thermalization of the product neutron causes proton recoils, which in turn yield an additional prompt energy contribution with finite width such that this process can mimic neutrinos at around 5 MeV energy. We find that the minimal viable model that could induce this reaction involves a sterile neutrino charged under an Abelian symmetry group. Such sterile neutrinos can simultaneously explain the discrepancy between the measured and predicted antineutrino fluxes at short-baseline reactor experiments.

### Poster included in proceedings:

yes

**Primary author(s) :** Dr. BERRYMAN, Jeffrey M. (Virginia Tech); Dr. BRDAR, Vedran (MPIK Heidelberg); Prof. HUBER, Patrick (Virginia Tech)

**Presenter(s) :** Dr. BRDAR, Vedran (MPIK Heidelberg)

**Session Classification :** Poster Session Wednesday

**Track Classification :** Poster (not participating in poster prize competition)