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Study of Beta Decay Spectra for Predictions of Reactor Antineutrino Spectra

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There are two discrepancies between measured and predicted reactor antineutrino spectra, a flux difference called the “Reactor Antineutrino Anomaly” and a shape deformation at 5-7 MeV named the spectral “bump”. The use of the summation method as an alternative for calculating reactor antineutrino spectra predictions, together with beta feedings from Total Absorption Gamma Spectroscopy experiments, reduces the flux anomaly to a level of statistical insignificance. Due to this result, the e-shape collaboration developed telescopic electron detectors to directly measure the beta spectra of relevant nuclei expected to be associated with the bump, to improve the nuclear data and models employed to obtain reactor antineutrino spectra predictions. Measurements were performed at the IGISOL facility due to its capacity to generate highly pure radioactive beams. The ^{92}Rb and ^{142}Cs beta decays are the first and third contributors to the reactor antineutrino spectra in the region of the bump, and their measurements are presented in this talk along with predictions generated with different beta shapes and feeding models.

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