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Systematic Uncertainty in the Analysis of the Reactor Neutrino Anomaly

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We examine uncertainties in the analysis of the reactor neutrino anomaly, wherein it is suggested that only about 94% of the emitted antineutrino flux was detected in short baseline experiments. We find that the form of the corrections that lead to the anomaly are very uncertain for the 30% of the flux that arises from forbidden decays. This uncertainty was estimated in four ways, is larger than the size of the anomaly, and is unlikely to be reduced without accurate direct measurements of the antineutrino flux. Given the present lack of detailed knowledge of the structure of the forbidden transitions, it is not possible to convert the measured aggregate fission beta spectra to antineutrino spectra to the accuracy needed to infer an anomaly. Neutrino physics conclusions based on the original anomaly need to be revisited, as do oscillation analyses that assumed that the antineutrino flux is known to better than approximately 5%.