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Understanding the impact of detector systematics on future HK analyses

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Hyper Kamiokande (HK) is a next generation water Cherenkov detector, currently under construction in the Gifu Prefecture of Japan and due to begin operations in 2027.
The main physics goal of HK is to make the first observation of asymmetries in neutrino and antineutrino oscillations that arise from the CP violating phase. This is achieved by looking at oscillations within a neutrino beam produced at the J-PARC accelerator facility in Tokai. Other goals include searching for proton decay and detecting neutrinos from nearby supernovae and other astrophysical sources.
Addressing all of these goals requires the accurate reconstruction of neutrino interactions over a wide range of energies. This poses a challenge within a large-scale water Cherenkov detector as variations in detector qualities such as water properties may affect the quality of the reconstruction. It is important to quantify the effects these uncertainties will have on high-energy oscillation analyses and low-energy measurements.
This poster will present work being done to better understand the impact of detector systematics on event reconstruction in HK, with the aim of establishing a workable scheme for including these systematic uncertainties in future HK analyses.

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