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Deep Learning for Water Cherenkov Detectors

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Cherenkov radiation is widely used in particle physics and astro-physics since its discovery in the early 20th century.

Numerous water Cherenkov detectors have been deployed, with more in preparation, for various physics programs such as nucleon decay search and precise neutrino measurements. Like all other experiments, efficiently quantifying detector systematic uncertainties poses a significant challenge due to their intricate impacts on the observed physics. This challenge becomes even more crucial in the next generation experiments, where extensive data statistics will make the systematic effects the dominant uncertainties. Thankfully, the rapid advancements in artificial intelligence and deep learning offer promising solutions to tackle these challenges.

Presenter: XIA, Junjie (IPMU)

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