# JUNO with Dual Calorimetry

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The Jiangmen Underground Neutrino Observatory (JUNO) is a multipurpose neutrino experiment currently being built in Kaiping, Jiangmen, Guangdong, China. JUNO has broad physics potential. By studying the reactor neutrinos, JUNO is able to determine neutrino mass ordering greater than 3-sigma significance which is its primary physics goal, and JUNO will measure precisely three neutrino oscillation parameters with sub-percent precision. Beyond the reactor neutrinos, JUNO is capable to observe also supernova neutrinos, solar neutrinos, atmospheric neutrinos, geo-neutrinos and search for proton decay, etc. It will provide a unique opportunity to address some unsolved crucial questions in particle physics and astrophysics.

JUNO is going to be the world's largest ever liquid scintillator detector filled with 20,000 ton target mass, viewed by 2 photon detection systems: 18,000 20-inch (large) photo-multiplier tubes (LPMT) and 25,000 3-inch (small) photo-multiplier tubes (SPMT). The two PMT systems form the dual calorimetry for achieving the unprecedented 3% energy resolution at 1MeV and 1% energy scale uncertainty.

In this talk, I will introduce briefly the JUNO physics program and the detector design. Then I will focus on the dual calorimetry design in which the SPMT system is introduced to help conquering the 1 % energy scale uncertainty challenge, and then 3% at 1MeV energy resolution challenge for the mass ordering determination.

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