

第五届JUNO相关的理论和唯象研讨会
首个物理成果专题研讨会

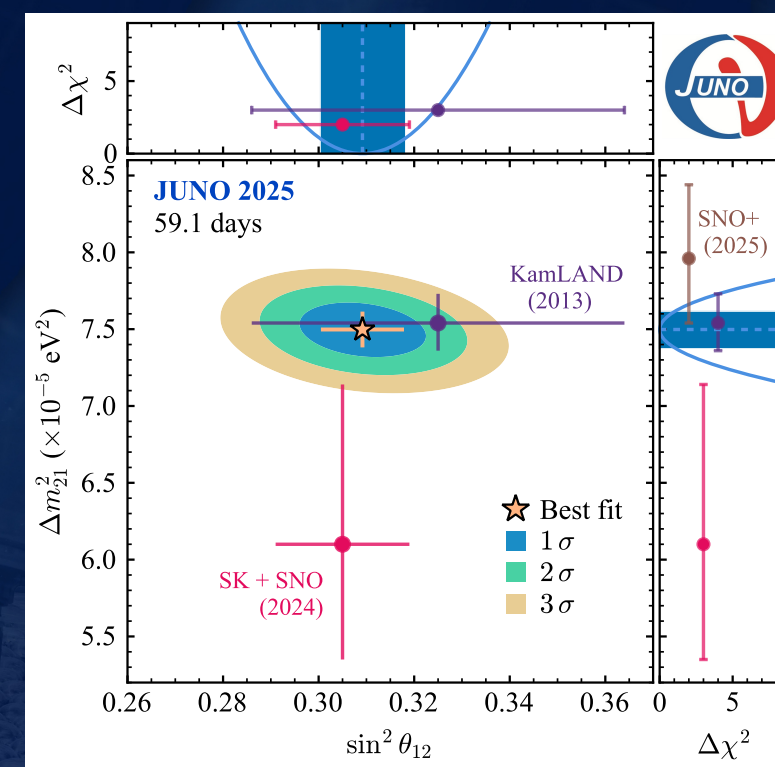
Specified Workshop on
First Physical Achievement in JUNO



博学笃志，格物明德

会议手册

Handbook



2026年1月27日-30日

杭州 · Hangzhou

<https://indico.ihep.ac.cn/event/27960/>



2025年8月26日，江门中微子实验（JUNO）正式运行。2025年11月19日，JUNO发布了其首个物理成果。经过不到两个月时间的取数，JUNO就把对 ν_e 和 ν_μ 两个中微子的质量平方差和对应的混合角的测量精度提高到了1.6%和2.8%。这一精度超出过去三十年国际上所有中微子实验探测的总和。

JUNO首次运行即取得重要成果，这为实验的后续研究提供了坚实的信心保障。接下来，JUNO将围绕其首要目标——确定中微子的质量顺序（正序 $m_1 < m_2 < m_3$ 或者倒序 $m_3 < m_2 < m_1$ ）——进行探测。除了首要目标外，在未来运行的若干年里，它还会在轻子味混合参数的精确测量、质子衰变、超新星中微子、太阳中微子、大气中微子、超出标准模型的新物理等诸多方面进行实验测量，有可能在多个方面获得重要成果，甚至是一些不可预期的发现。

以JUNO为代表的全球中微子精确测量时代已经到来。JUNO，以及后面几年将会运行的日本顶级神冈实验（Hyper-Kamiokande）和美国的深地中微子实验（DUNE），将会代表这个时代最重要的几个中微子实验，为实验上彻底解决中微子振荡问题给出最终答案。

本次研讨会将以JUNO公布首个物理成果为契机，探讨江门实验可能带来的物理应用，实验结果对未来中微子理论走向的影响，以及实验探测背后的一些故事。欢迎感兴趣的同行专家参加！

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一、会议日期：

2026年1月27日报到，28日、29日会议，30日离开

二、会议地点：

国科大杭州高等研究院云艺园区，杭州

三、会议组织：

周也铃（杭高院）、李玉峰（高能所）

周顺（高能所）、葛韶锋（李所）

四、食宿安排：

食宿费用自理

五、会务联系：

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On August 26, 2025, the JUNO experiment officially started data collection. On November 19, 2025, JUNO released its first result. After collecting data for less than two months, JUNO has already improved the precision of the mass-squared difference between the ν_1 and ν_2 neutrinos as well as the corresponding mixing angle to 1.6% and 2.8%, respectively. Its precision level surpasses the combined achievements of all neutrino experiments around the world over the past three decades.

JUNO's first run has yielded significant results, providing strong confidence for the future research of neutrino experiments. Next, JUNO will focus on its primary goal: determining the neutrino mass ordering (normal ordering $m_1 < m_2 < m_3$ or inverted ordering $m_3 < m_1 < m_2$). Beyond this, JUNO will also conduct experimental measurements in many different fields in the coming years of operation, including precision measurements of the lepton flavor mixing parameters, proton decay, supernova neutrinos, solar neutrinos, atmospheric neutrinos, and searches for new physics beyond the Standard Model. JUNO may achieve major breakthroughs in multiple areas, and even make unexpected discoveries.

The era of high-precision neutrino measurements, represented by JUNO, has now begun. JUNO—together with the Hyper-Kamiokande experiment in Japan and the DUNE experiment in US, both scheduled to begin operation in the coming years—will serve as the most important neutrino experiments in the coming years. They will provide the final answers for fully resolving our quest of neutrino oscillations. Taking JUNO's first physics results as an opportunity, this workshop will discuss the potential physics applications of the Jiangmen experiment, its implications for the future development of neutrino theory, and the stories behind the experiment's achievements. We warmly welcome interested colleagues and experts to participate!

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1. Dates:

Jan 27-30, 2026, including arrival and departure dates

2. Location:

Hangzhou

3. LOC:

Ye-Ling Zhou (HIAS), Yu-Feng Li (IHEP)

Shun Zhou (IHEP), Shao-Feng Ge (TDLI)

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江门中微子实验概览

江门中微子实验是在广东省江门市地下700米建设的一个国际领先的大规模中微子实验室，江门中微子实验将以测量中微子质量顺序为首要目标，同时也将精确测量中微子混合参数，研究大气中微子、太阳中微子、超新星中微子、地球中微子和质子衰变等，具有丰富的物理目标。江门中微子实验已于2025年8月26日建成并运行取数。这将使我国成为国际中微子研究的中心之一。

核心装置：中心探测器

江门中微子实验室的主体是一个有效质量为2万吨巨型球形液体闪烁体探测器，称为中心探测器，其低本底、高透明度的技术指标达到了前所未有的高度。

- 探测原理：内壁布满光电倍增管，用于捕捉中微子被液体闪烁体“俘获”时产生的微弱闪烁光，并将其转化为电信号。

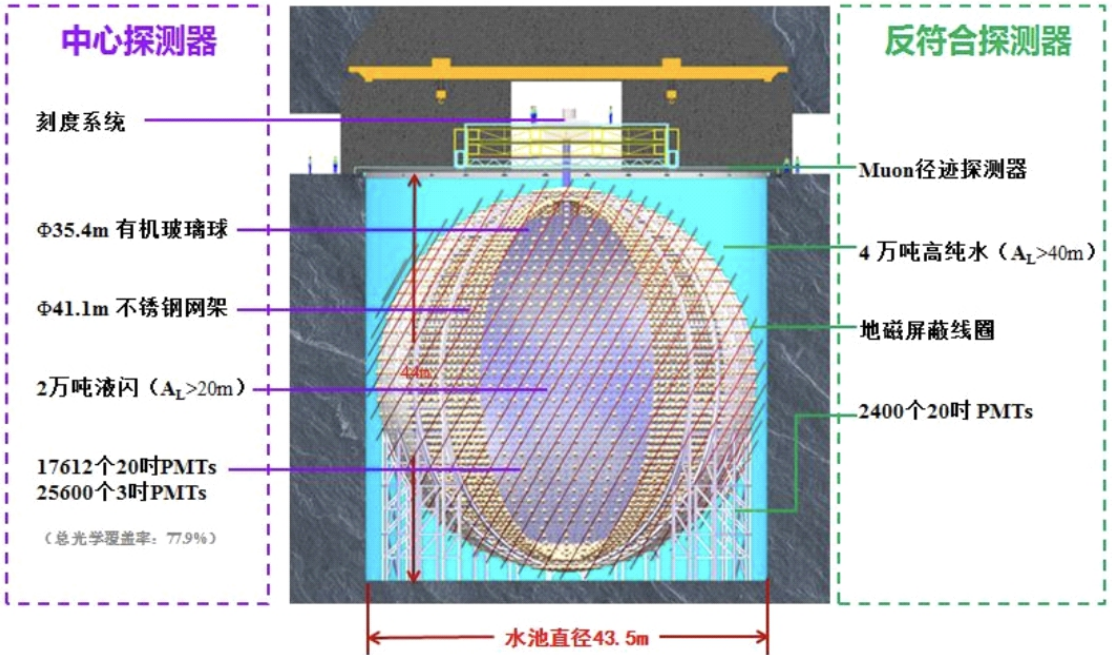
- 性能突破：

体积：较目前国际最好水平提升了20倍。

光电子产额：提升了2.5倍。

能量分辨率：达到了前所未有的3%。

JUNO探测器核心指标



江门中微子实验探测器核心指标

Jiangmen Underground Neutrino Observatory (JUNO)

JUNO is a world-leading, large-scale neutrino laboratory constructed 700 meters underground in Jiangmen, Guangdong Province. JUNO's primary scientific objective is to determine the neutrino mass hierarchy. Additionally, it aims to precisely measure neutrino mixing parameters and study atmospheric, solar, supernova, geo-neutrinos and proton decays, encompassing a diverse range of physics goals. The experiment has been completed and began data acquisition on August 26, 2025, positioning China as a global hub for neutrino research.

The Central Detector

The core of the laboratory is the Central Detector (CD), a spherical liquid scintillator detector with an effective mass of 20,000 tons, characterized by its low background and high transparency.

- **Detection Mechanism:** The inner wall of the Central Detector is lined with Photomultiplier Tubes (PMTs). These tubes detect the scintillation light produced when neutrinos are "captured" by the liquid scintillator, converting the light signals into electrical signals for output.
- **Performance Benchmarks:** Compared to the current international state-of-the-art, JUNO's liquid scintillator volume is 20 times larger, the photoelectron yield has increased by 2.5 times, and the energy resolution has reached an unprecedented 3%.

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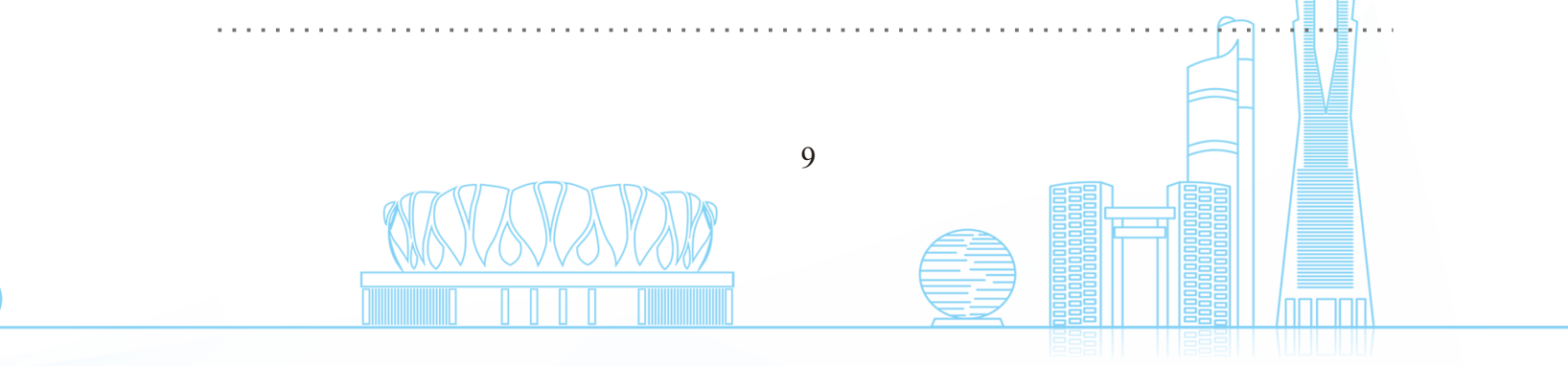
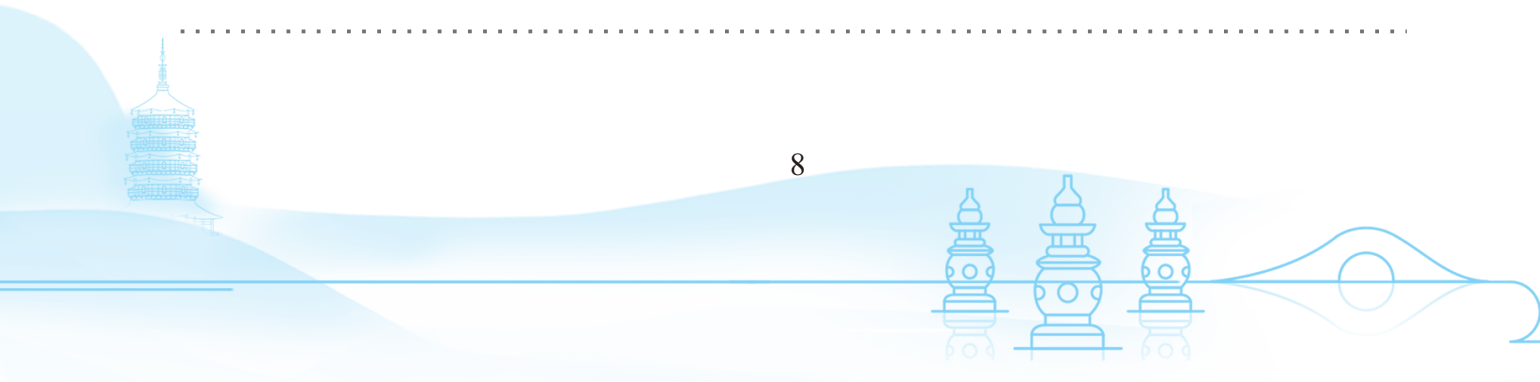
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