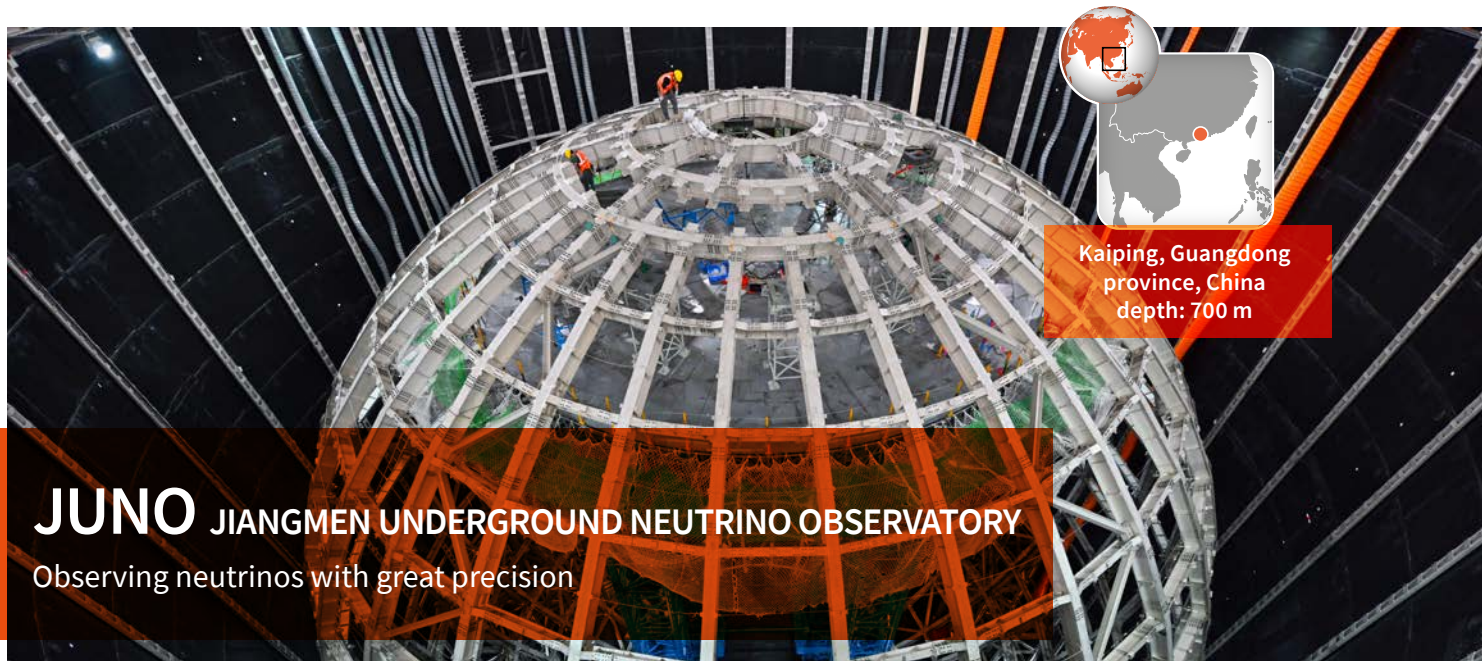
National Institute of Nuclear and Particle Physics

The origin, nature, masses and mixing of neutrinos



JUNO JIANGMEN UNDERGROUND NEUTRINO OBSERVATORY

Observing neutrinos with great precision

- **Scientific leader:** Marcos Dracos (IPHC) *
- **Laboratories involved:** CC-IN2P3 (Lyon), CPPM (Marseille), IJCLab (Orsay), IPHC (Strasbourg), LP2i (Bordeaux), OMEGA (Paris), Subatech (Nantes)
- **Nature:** research infrastructure
- **Status:** international project under construction, mainly financed by the Chinese Academy of Sciences (CAS)
- **Website:** http://juno.ihep.cas.cn/

SCIENTIFIC OBJECTIVES

JUNO is a detector of antineutrinos emitted by nuclear reactors. Its unprecedented size and accuracy will give access to the order of the masses of the three known neutrinos, and to a precise measurement of three of the five parameters describing their oscillations. These values will have implications for particle physics and cosmology. JUNO will also study neutrinos of terrestrial and extra-terrestrial origin (supernovae, atmosphere, sun), to better understand the quantity of certain radioactive elements on Earth and certain mechanisms that govern the evolution of the Universe.

RESOURCES DEPLOYED

The detector is a transparent sphere 35.4 m in diameter, filled with 20 000 tonnes of scintillating liquid that emits light as charged particles pass by. 42 000 photomultipliers spread around it will record the events. JUNO is buried 700 m below ground so that it is not affected by the flow of cosmic particles. To detect any particles that reach it, it is immersed in a detection pool and topped with a trajectograph. JUNO's energy resolution will be unprecedented: 3% for particles of 1 MeV.

400 scientists

35 metres in diameter

18 participating countries

20K tonnes of glittering liquid

77 institutions, 34 of which are Chinese

IN2P3 CONTRIBUTIONS

- Improvement of the electronics of the cosmic particle trajectograph (CPT).
- Preparation of the electronics for reading the 3-inch photo multipliers (sPMT)
- Participation in the selection of low radioactive materials for the construction of the detector

2014 End of the design phase. Start of international collaboration

2015 Construction begins

2018 End of sPMT mass production and testing

2020 End of construction work

2021 Installation of equipment

2023 End of construction and start of operation

* Since 2019

April 2022