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Deep Underground laboratories in China

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ABSTRACT

The combination of observations in space, experiments at particle accelerators, and experiments underground are very important to study the picture of the universe. Underground researches are playing a key role.

In the experiments like dark matter, neutrino mass and proton stability studies, the cosmic rays become the source of a limiting background, in particular the irreducible background could come from the high-energy neutrons (produced by penetrating muons). To greatly shielding cosmic ray related background, future experiments will likely require greater depth. Over the next two decades the field may well require depths to 6000 m.w.e or more.

The earliest time of Chinese physicists looking for an underground site for physics study can be traced back to 70th, which is about the same time as Gran Sasso and Kamioka proposal. But it was only in December 2010 that China's first deep underground laboratory, the China Jinping Underground Laboratory (CJPL), was opened and put into operation in Yalongjiang Jinping Hydropower Station in Sichuan province. The CJPL jointly constructed by Tsinghua University and Ertan Hydropower Development Company, is located 2,400 meters rocks under the Jinping Mountain.

The Chinese Academy of Sciences (CAS) had long been planning to construct a national underground laboratory, right now there are 5 institutions have great interest on this, they are from different research areas, including Institute of High Energy Physics, Institute of Geodesy and Geophysics, Institute of Modern Physics, Institute of Physics and Mathematics and Institute of Rock and Soil Mechanics. Planning for such a multi-purpose, international underground laboratory is underway.