

Sterile Neutrino

JSNS2 Newsletter

발행처 : 일본 J-PARC 가속기를
이용한 JSNS2 실험 연구단
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Introduction

Historically precision studies of the neutrino sector have resulted in new breakthroughs and unexpected discoveries. Data from LSND, MiniBooNE, Gallium/SAGE and reactor neutrino experiments hints at the existence of additional neutrinos besides the three active neutrinos. World wide there are now intense efforts to search for these additional sterile neutrinos. JSNS2 is one of the most promising experiments, that is only made possible through critical contributions from Korean groups. JSNS2 stands for J-PARC Sterile Neutrino Search at J-PARC Spallation Neutron Source (E56). The experiment has now entered the construction phase and is expected to start data taking in about a year. JSNS2 has a high discovery potential and can directly check LSND and the the longest standing neutrino anomaly associated with it.

Conferences of Interest

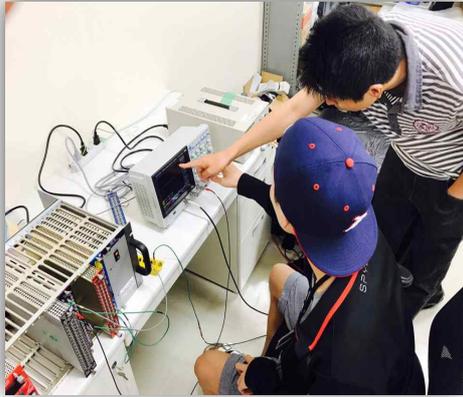
- **KPS Fall Meeting:** Oct. 25(Wed) ~ Oct. 27(Fri)
 - JSNS2 students are encouraged to submit posters. Abstracts should be circulate at least one week before abstract submission within the Korean JSNS2 Collaboration. *Please let me know in case you plan to submit an abstract so that we can coordinate submissions.*
 - Abstract submission : Aug. 1 ~ Aug. 31
 - Venue: GyeongJu Hwabaek International Convention Center

JSNS2 related meetings and activities

- **SKKU JSNS2 Meeting** was held on Monday May 29th
- **JSNS2 August Monthly Phone Meeting** was held on August 4th
- **SNU JSNS2 Meeting** will be held on Friday August 25th
- **KPS Pioneer symposium** on “*Sterile Neutrino Searches and the JSNS2 Experiment*” will be held during the KPS Fall Meeting Oct. 25(Wed) ~ Oct. 27(Fri). Most likely the symposium will be held mostly likely on Friday October 27th.
 - Invited foreign speakers include: Patrick Huber (Virginia Tech, USA), Takasumi Maruyama (KEK, Japan), Jungsic Park (KEK, Japan), Yufeng Li (IHEP, China), Joshua Spitz (Michigan, USA)

General activities and news

- Korean participation in the JSNS2 experiment: Prof. Taka Maruyama, a spokesperson of JSNS2, with his staffs visited the Korea Neutrino Research Center (KNRC) a couple of times in 2016. Initially they wished to learn how to make gadolinium (Gd) loaded liquid scintillator and visited the RENO's facility. As no research grant could be obtained by US collaborators, the spokesperson wished KNRC to join JSNS2. The possibility of joining was discussed among KNRC members, and they decided to participate in Dec. 2016. The Korean group was formed to contribute by providing 17 tons of Gd LS and 35 tons of LS using a part of KNRC budget. The application was submitted and presented in the JSNS2 collaboration meeting in late January, 2017, and was approved to become collaborators.
- A travel grant of 195M won per year for three years was obtained for the Korean JSNS2 group in May, 2017. The project consists of 7 subgroups, and Prof. Carsten Rott is the PI. This support will be quite useful for travel to J-PARC and KEK for the JSNS2 research activity.
- Korean collaborators contribute to several committees of JSNS2. Prof. Kyungkwang Joo was appointed as a By-Law committee member and finished his successful role. Prof. Intae Yu became a member of Speakers Board and also a member of Spokesperson Selection Committee. Dr. JeeSeung Jang is a member of electronics timeline review committee.
- The Japanese collaborators (Maruyama/Hasegawa/Furuta/Jungsic Park) came to Korea late February to visit KOATECH, Younggwang site and NOTICE.
- Jungsic Park, Kyungkwang Joo, and Soo-Bong Kim estimated cost for Gd LS and LS production. They also obtained a quote for refurbishing the RENO liquid production system. They have participated actively in monthly meetings, several informal meetings and e-mail exchanges on liquid scintillator development and the issue of obtaining 30 tons of Gd LS from Daya Bay. Prof. Maruyama met Jun Cao, a Chinese deputy leader of Daya Bay, and obtained a firm agreement to provide it for JSNS2.
- Soo-Bong Kim and Jeongyeol Yang have been contributing to the PMT mounting structure and have participated in the discussion on skype meetings. They also participate in the discussion of detector structure and installation schemes.
- A Korean company, KOATECH, was selected as a manufacturer of the JSNS2 acrylic vessel after the Japanese visit to Korea and Taiwan and extensive review and discussion. The KOATECH built acrylic vessels for RENO. However, KOATECH finally withdrew from it because no deposit can be made in Japanese payment. Soo-Bong Kim has helped the necessary discussion between KOATECH and Japanese collaborators and also participated in the discussion of design.
- For reuse of 10 inch PMTs from Double-Chooz, it is necessary to check the PMT saturation. Jeongyeol Yang, SangYong Kim and JeeSeung Jang are working on the saturation test bench setup.
- Prof. MyengYoul Pac and Dr. Juneho Choi will visit J-PARC in August, to work on development of software tools.
- Students Hyoungkoo Jeon, Sanghoon Jeon, and Gyunho Yu are visiting J-PARC for summer research experiences and to work on simulations, JSNS2 mock-up detector.



Student Sanghoon Jeon and Dr. Jungsic Park at J-PARC working at the DAQ system design



J-PARC MLF mercury target on display. The mercury target is essential to create the neutrino flux from pion and kaon decay at rest used by JSNS2. Photo taken by student Hyoungkoo Jeon during his summer research experience at J-PARC.

Job opportunities

- SKKU has an opportunity for a postdoc position including the possibility to work on JSNS2. Details can be found here: <https://inspirehep.net/record/1609977>
- A Proposal for a Three Detector Short-Baseline Neutrino Oscillation Program in the Fermilab Booster Neutrino Beam ([arXiv:1503.01520](https://arxiv.org/abs/1503.01520))
- (1) On July 27th two ICARUS detector modules have arrived at Fermilab in Chicago after six weeks on the road. Detail on the trip can be found here <http://icarustrip.fnal.gov/>
- (2) JSNS2 Website is getting setup now. It will consist of a publicly accessible website with general news on JSNS2 and an internal website. The internal website will summarize details how to travel to JPARC and outline travel rules. It will contain a members directory and many details about the experiment Technical Design Report (TDR): Searching for a Sterile Neutrino at J-PARC MLF (E56, JSNS2) [arXiv:1705.08629](https://arxiv.org/abs/1705.08629)

General news

About this letter and Contact Information:

The sterile neutrino letter is expected to appear on a quarterly basis. If you would like to contribute to this newsletter please contact Carsten Rott or Sara Yoo. Contributions are very welcome.