

Introduction to Vietnam Neutrino Group

Nguyen Thi Hong Van, IFIRSE
on behalf of the group



Group Formation

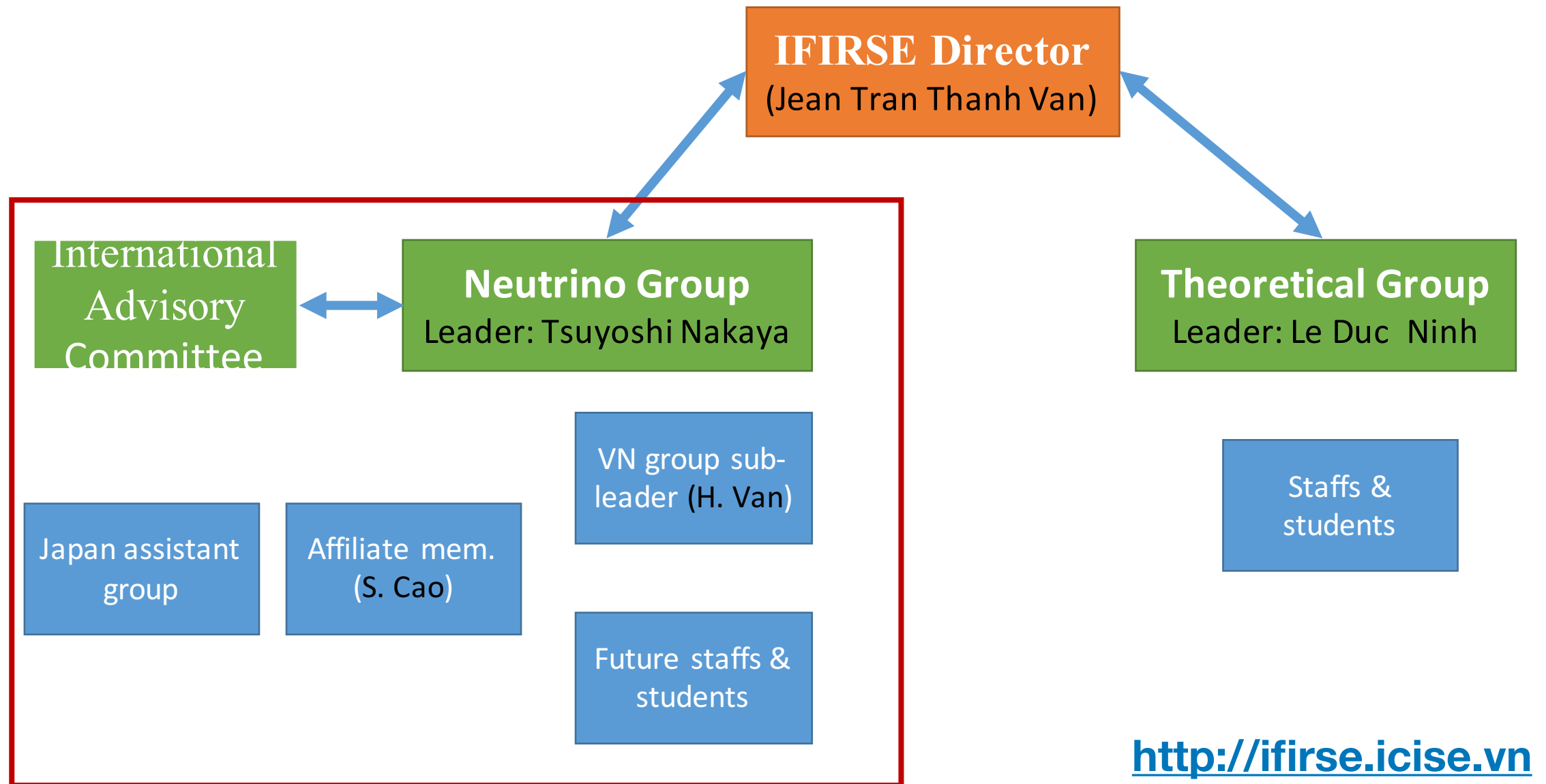


- Formed on July 17th, 2017 with an MoU signed between JP physicists and RVN
- Location: IFIRSE, Quy Nhon, Binh Dinh, Vietnam
- Organization: VN members with help from core JP physicists and an International Advisory Committee



Group webpage: <http://ifirse.icise.vn/nugroup/>

IFIRSE organization



Members of Japan side & IAC

Core group members of JP side

- T.Nakaya (Kyoto Univ.): scientific group leader
- Atsumu Suzuki (Kobe Univ.)
- Yuichi Oyama (KEK)
- Makoto Miura (Kamioka, ICRR, Tokyo)

International Advisory Committee

- M. Nakahata (Kamioka, ICRR, Tokyo, JP)
- T. Kobayashi (KEK, JP)
- Karol Lang (The Univ. of Texas at Austin, USA)
- Jacques Dumarchez (LPNHE- Univ. of Paris, FR)
- Boris Kayser (Fermilab, USA)



Members of Vietnam side

- **Nguyen T. H. Van** (IFIRSE & IOP)
- **Cao V. Son** (Affiliated member, postdoc in KEK)
- **Nguyen M. Truong** (Affiliated member, staff at Da Dang Univ.)
- **Tran V. Ngoc** (IFIRSE, Ph.D student)
- **Le H. Minh** (IFIRSE, Ph.D candidate)
- **Nguyen H. D. Thanh** (Undergraduate student)
- **Nguyen K. Ha** (Undergraduate student)
- Other affiliated members (Le P. Trung, postdoc working MinervA, Phan D. Dung, Ph.D in MINOS (+)/NOvA, Nguyen N. Le, Hue Univ., etc...)



We are growing and expanding

Activities of VN neutrino group since 2017



The logo for icise (International Center for Inclusive Science and Education) is located in the top right corner. It features a stylized globe icon with blue and green lines, followed by the text 'icise' in a blue sans-serif font, and 'QUY NHON VIETNAM' in a smaller, spaced-out blue font below it.

- Since Oc. 2017, joined T2K, an international accelerator-based long-baseline neutrino experiment in Japan (~500 collaborators from 65 institutes of 12 countries)
- Since Feb. 2018, joined WAGASCI, a neutrino-nuclei interaction-focused experiment in Japan,
- Organized 1st *Vietnam School on Neutrinos*, 9-21 July 2017: 20 students (10 VN, 4 JP and 6 other countries); to **train and encourage students and young researchers working on neutrino physics**
- Organizing 2nd *Vietnam School on Neutrinos*, 8-20 July 2018: 19 students (10 VN, 6 JP and 3 other countries)
- Hosting the *International Symposium on Neutrino Frontiers*

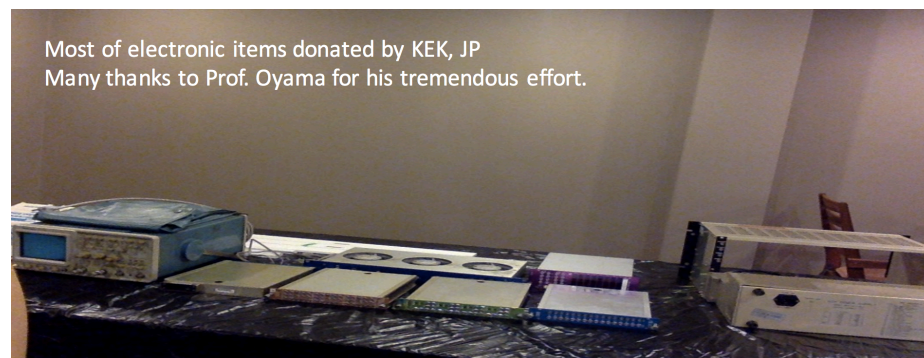
Research topics

- **T2K-related**

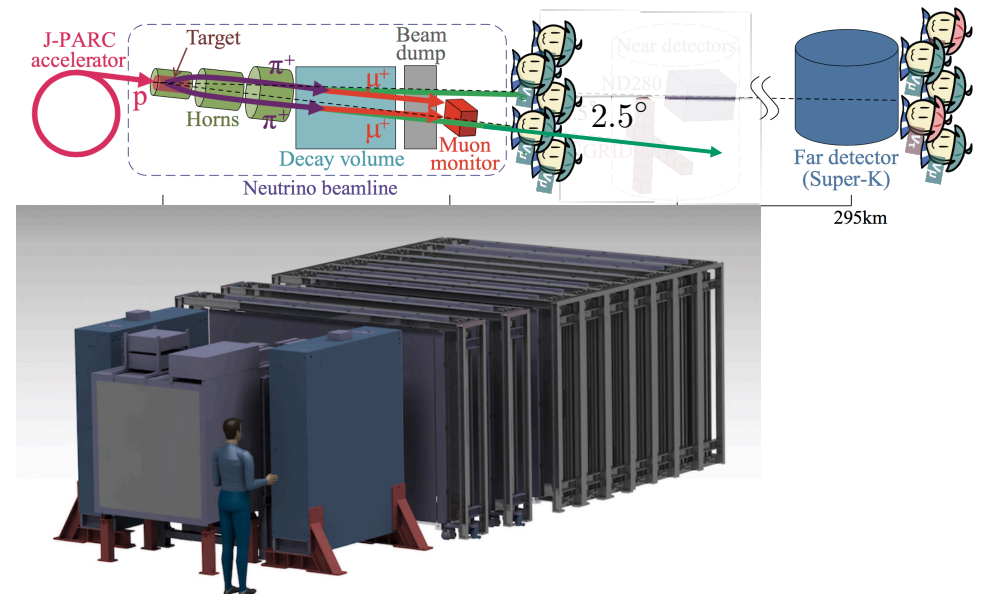
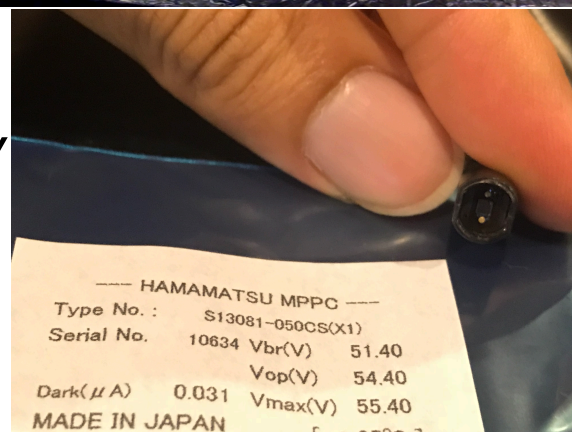
- Oscillation analysis, particularly CPT invariant test
- Document NEUT, a neutrino event generator, used in T2K and other experiments in Japan

- **WAGASCI-related**

- MC simulation
- Cross section measurement



*MPPC donated by
Kyoto and
Yokohama Univ.*



- **Other (for undergraduate & standalone development)**

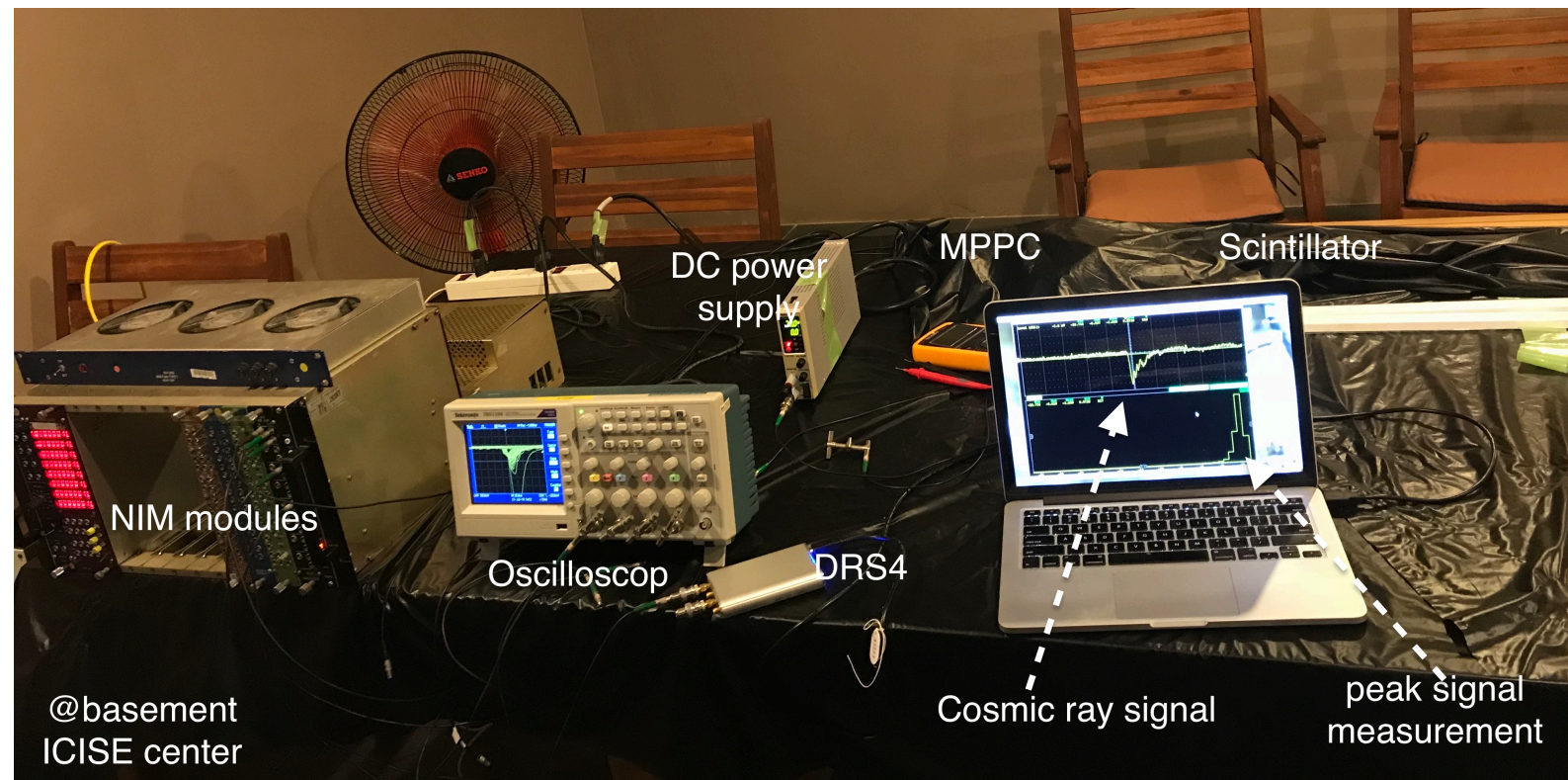
- Physics potentials of on-going/future neutrino experiments such as T2K-II, NOvA, Hyper-K...and their combination
- Basic understanding with experimental orientation of neutrino oscillation framework such as the (non-)unitary of mixing matrix, degeneracy of oscillation parameters

- **Hardware development at ICISE**

- Multi-pixel Photon Counter
- Prototype detectors

Hardware at ICISE & Lab building

- It's very important to have some R&D right at ICISE
- We have some experiences with photon-detector, particularly MPPC & PMT and DAQ
- Some kindly-donated equipment from KEK and other Japanese institutes (used for school training since 2017)
- Start buying more equipments to study more about MPPC



Your suggestion would be very appreciated

More details about VN members

Member: Nguyen T. H. Van

Recent activities

- T2K member since Oct 2017
- Participated in Neutrino beam group of T2K/ KEK: process beam data for T2K experiment; improve neutrino flux uncertainty with J-PARC neutrino beam monitors and T2K near detectors
- NEUT technical note for T2K (joint-work with Hayato-san (ICRR) and Son (KEK)) (*talk on Tuesday*)
- Lectures on neutrino event generators in VSoN 2018
- Will give a talk of T2K latest results on behalf of T2K collaboration in “*Windows on Universe*”(August 2018, ICISE)
- Involved in CPT analysis (just started)



Past education and Experiences:

- Ph.D in France with ATLAS (2011)
- Physics analysis of precision measurements with ATLAS
- Neutrino phenomenology: flavor symmetry and other models of neutrino masses and mixing

Member: Cao V. Son

Recent activities

- T2K member since Aug. 2014; also Super-K and Hyper-K collaborator
- Joining Neutrino group in KEK, IPNS,
 - Monitor neutrino beamline, particularly beam loss
 - R&D on non-destructive beam profile monitor for MW beam (*talk on Tuesday*)
- Some service tasks
 - Convener of a cross-section measurement
 - (past) Convener of T2K on-axis detector, i.e INGRID
- Others
 - Physic potential of T2K-II
 - Calibration and software for EGADS
 - Lectures for VSoN school



Past education and Experiences:

- Ph.D at UTexas at Austin on MINOS experiment
 - CPT test with full MINOS beam and atmospheric data
 - Auxiliary detector to reduce electronic latency in neutrino Time-Of-Flight measurement
- Researcher Associate at Okayama Univ. on EGADS R&D experiment
- JSPS fellow at Kyoto Univ. on T2K experiment

Member: Nguyen M. Truong

- **Current/future activities**

- Study MPPC at ICISE (as a frequent visitor)
- Hardware training for VSoN 2018 school
- MC, event reconstruction, neutrino-nuclei cross section measurement with WAGASCI

- **Past experiences**

- MPPC study for MuSIC experiment
- Straw tube tracker study for COMET experiment
- Cosmic ray induced background study by MC and FPGA for DeeMe experiment



Past education

Ph.D at Osaka Univ.

“Estimation of Cosmic Ray Induced background and a FPGA-based Data compression Algorithm for DeeMe Experiment”, 2017

Member: Tran V. Ngoc

Current status and future plan:

- Became an official member of T2K since May, 2018
- Recent work with GLoBES: CPV sensitivity of T2K-II and NOvA in combination (*talk on Tuesday*)
- Doing Ph thesis on a topics of CP violation with neutrino oscillation experiment
- Involved in CPT analysis with H. Van and other research topics in T2K



Past education and Experiences:

- Bachelor thesis on neutrino oscillation
- Master thesis on Higgs physics in beyond SM

Member: Le H. Minh

Past education & experience:

- B.Sc. and M.Sc. at HCM Univ. of Science: On electroweak baryogenesis in 3-3-1 models
- M.Sc. at Pierre-and-Marie-Curie Univ. (UPMU), Fr. (~July 2018): on Analysis of Data from Time Projection Chambers of T2K ND280 Detector

Current status and future plan

- Applying a Ph.D position at IFIRSE
- Hope to join T2K as member of Neutrino group



Member: Nguyen T. K. Ha

Education and Experiences

- Undergraduate at HCM Univ. of Science (finishing July 2018)
- Topics: “*Unitary of leptonic mixing matrix*”

Future plan

- Continue working in Neutrino group at IFIRSE
- Start Master program in Nov. 2018



Member: Nguyen H. D. Thanh

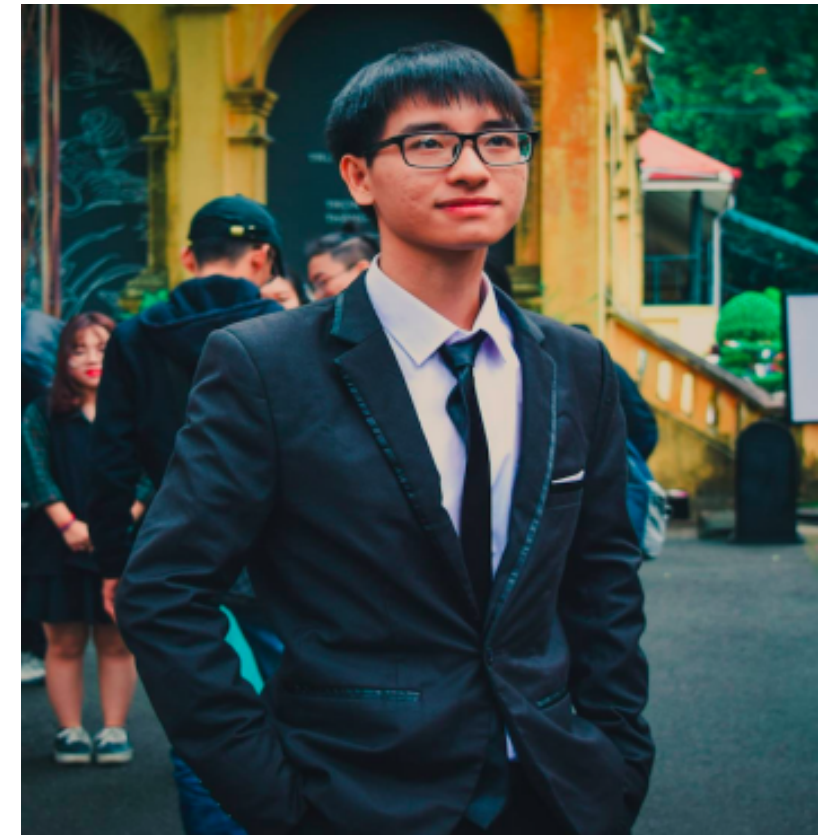


Education and Experiences

- Undergraduate at VNU Univ. of Science, Hanoi (graduated June 2018).
- Topics: “*Resolving degeneracies for CP violation search in neutrino experiments*”.

Future plan

- Participate in SOKENDAI summer program organized by KEK (Sept. to Oct. 2018)
- Plan for Master/Ph.D program after this summer



Plan for future

- Keep working with T2K/WAGASCI experiments,
- Expand the group: hire more senior researchers, invite more affiliated members, visitors and keep enrolling students,
- Longer term: plan to join also next generation of neutrino experiment, Hyper-Kamiokande,
- It's very important to build lab and prototype detector here at ICISE for neutrino-related search and/or dark matter search.



**We are asking your support for developing neutrino in Vietnam.
Thank you for coming!
We hope to work with you on this interesting particle.**