



XXIX International Conference on Neutrino Physics and Astrophysics

Monday 22 June 2020 to Thursday 2 July 2020

Organizing Committee Co-Chairs: S. Brice (Fermilab), M. L. Marshak
(University of Minnesota), G. Zeller (Fermilab)

Neutrino 2020 Logistics

- Neutrino 2020 was originally planned as a 5 day, in-person conference at a large hotel in Chicago city center.
- In late March 2020, Neutrino 2020 was switched to an online conference using the Zoom platform for Plenary talks.
- Neutrino 2020 Components
 - 79 Plenary talks scheduled from 0700 to 1130 (Chicago time) for 8 days (Monday to Thursday 22 June to 25 June and 29 June to 2 July)
 - Four poster sessions displaying 532 posters
 - Slack channels for questions to speakers and follow-up discussions
 - Virtual Reality to facilitate discussions at poster sessions
 - Physics Slam public outreach event

Neutrino 2020 Statistics

- Registrants: 4,350
- Registrants were domiciled on every continent (including Antarctica) and from 67 countries.
- 65% of registrants were from outside the host country (United States)
- 26% of registrants were female
- About 60% of registrants were students or post-docs.
- 33 members of the International Advisory Committee (42% female)

Neutrino 2020 Plenary Talks

- 79 Plenary Talks presented as Zoom Webinars
- Participants were encouraged to use the Zoom Q&A function for questions to speakers
- Session Chairs selected questions to ask speakers at the end of their talks. Unasked questions were moved to the appropriate Slack channel for offline Speaker follow-up.
- 3,387 unique individuals connected at least once to Plenary Talks. Typically, between 1,000 and 1,500 participants were connected simultaneously during Plenary sessions

Neutrino 2020 Slack Channels

- The Slack platform was used to facilitate offline discussions.
- Slack discussions regarding a talk often started during the talk. Unanswered questions from Chat were added to the appropriate Slack channel at the end of a talk.
- Speakers were encouraged to respond to questions posted on Slack.
- Neutrino 2020 participants posted 23,078 Slack messages.

Neutrino 2020 Posters

- 532 Posters were presented in four poster sessions.
- Poster presenters were encouraged to upload two-minute videos describing their work to YouTube.
- Poster videos were viewed 5,800 times.
- Posters were also displayed as .pdf files on the Conference website and as billboards via the Virtual Reality.

Sample Poster

Poster #6
(Poster is in session #3)

The European Spallation Source neutrino Super Beam project

Toshihiko Ota, Ekolford Tord, Marcos Dracos
for ESSnuSB

Nu2020 #6: The ESSnuSB project will try to discover CP violation...
Watch! Share
Longer baseline than 1st max

Garpenberg (L=540km)
Zinkgruvan (L=360km)

The ESSnuSB project will try to discover CP violation using the 2nd neutrino oscillation maximum.

FULL ABSTRACT

European Spallation Source Neutrino Superbeam Experiment (ESSnuSB)
— Physics potential Eur. Phys. J. C80 (2020) 190, arXiv:1912.04309 [hep-ph]

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Abstract
The International and European neutrino beam project for the European Spallation Source (ESS) aims to provide a high-intensity neutrino beam for the ESSnuSB experiment. The beam is produced by a proton beam hitting a target, producing pions and kaons, which decay into neutrinos. The beam is then directed towards the ESSnuSB detector, which is located at a distance of 540 km from the target. The beam is expected to have a flux of 10^{11} neutrinos per second, which is significantly higher than the flux of the existing neutrino beams. The ESSnuSB experiment will use the beam to study neutrino oscillations and CP violation. The experiment will be the first to use a beam of neutrinos to study CP violation, which is a major goal of neutrino physics.

ESS: Accelerator
The ESS is a proton accelerator with a maximum energy of 2.4 GeV. The beam is produced by a proton beam hitting a target, producing pions and kaons, which decay into neutrinos. The beam is then directed towards the ESSnuSB detector, which is located at a distance of 540 km from the target. The beam is expected to have a flux of 10^{11} neutrinos per second, which is significantly higher than the flux of the existing neutrino beams. The ESSnuSB experiment will use the beam to study neutrino oscillations and CP violation. The experiment will be the first to use a beam of neutrinos to study CP violation, which is a major goal of neutrino physics.

Far detector for 2nd maximum
The far detector is located at a distance of 540 km from the target. It is a water Cherenkov detector with a total mass of 100,000 tonnes. The detector is designed to detect neutrinos by measuring the Cherenkov light produced when a neutrino interacts with a water molecule. The detector is expected to have a sensitivity of 10^{-11} for the 2nd maximum of the neutrino oscillation, which is significantly better than the sensitivity of the existing neutrino detectors. The ESSnuSB experiment will use the far detector to study neutrino oscillations and CP violation. The experiment will be the first to use a beam of neutrinos to study CP violation, which is a major goal of neutrino physics.

Atmospheric neutrinos at the far detector
The far detector will also detect atmospheric neutrinos, which are produced by cosmic rays interacting with the atmosphere. The detector is expected to have a sensitivity of 10^{-11} for atmospheric neutrinos, which is significantly better than the sensitivity of the existing neutrino detectors. The ESSnuSB experiment will use the far detector to study atmospheric neutrinos, which is a major goal of neutrino physics.

Physics performance of ESSnuSB-estimates
The physics performance of the ESSnuSB experiment is estimated to be significantly better than the performance of the existing neutrino experiments. The experiment is expected to have a sensitivity of 10^{-11} for the 2nd maximum of the neutrino oscillation, which is significantly better than the sensitivity of the existing neutrino detectors. The ESSnuSB experiment will use the far detector to study neutrino oscillations and CP violation. The experiment will be the first to use a beam of neutrinos to study CP violation, which is a major goal of neutrino physics.

To improve the performance...
The performance of the ESSnuSB experiment can be improved by increasing the beam intensity, increasing the detector mass, and increasing the detector sensitivity. The experiment is expected to have a sensitivity of 10^{-11} for the 2nd maximum of the neutrino oscillation, which is significantly better than the sensitivity of the existing neutrino detectors. The ESSnuSB experiment will use the far detector to study neutrino oscillations and CP violation. The experiment will be the first to use a beam of neutrinos to study CP violation, which is a major goal of neutrino physics.

Related studies and work in progress
The ESSnuSB experiment is related to other neutrino experiments, such as the T2K experiment, the NOvA experiment, and the DUNE experiment. The ESSnuSB experiment will use the far detector to study neutrino oscillations and CP violation. The experiment will be the first to use a beam of neutrinos to study CP violation, which is a major goal of neutrino physics.

Neutrino 2020 Virtual Reality

- Four Poster Sessions encouraged access to posters via Virtual Reality (VR).
- The VR platform hosted 3,409 unique visitors.
- Upon entry to the VR, visitors were assigned an avatar, which they could optionally customize.
- Five posters were displayed in each of 30 rooms. Additional rooms were assigned for discussions or tours of Chicago or Fermilab.
- Visitors were able to move around within or between rooms. When a visitor's avatar approached other avatars, the visitors could speak and hear the other avatars' visitors. Thus a discussion was enabled among visitors whose avatars were proximate.

[illegible]

Neutrino 2020 zooms into virtual reality

Neutrino 2020 Physics Slam (Public Outreach)



Kirsty Duffy, FNAL



Alan Poon, LBL



Sam Sempere
Syracuse

- Thursday, 2 July 2020, 4:30 pm to 5:30 pm CDT (GMT-5)
- Sponsored by Chicago Council on Science and Technology and Fermilab
- Link from Neutrino 2020 Home Page (<https://www.c2st.org/event/neutrino-2020-physics-slam/>)
- Free advance registration on Physics Slam Home Page is required (optional donation)

Neutrino 2020 Local Organizing Committee

S. Brice (co-chair) Fermilab

M. Del Tutto Fermilab

A. Habig Univ. of Minnesota Duluth

M. Hronek Fermilab

M. Marshak (co-chair) Univ. of Minnesota Twin Cities

T. Mohayai Fermilab

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E. Snider Fermilab

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