

# NEUTRINO 2022

XXX International Conference on Neutrino Physics and Astrophysics

*Virtual Seoul* May 30 (Mon) - June 4 (Sat), 2022



## Closing Remarks

Sunny Seo

Co-chair with Yeonngduk Kim

June 4, 2022

KPS 한국물리학회  
The Korean Physical Society

ibS Institute for  
Basic Science

KIAS



**Thank you very much all of you !**

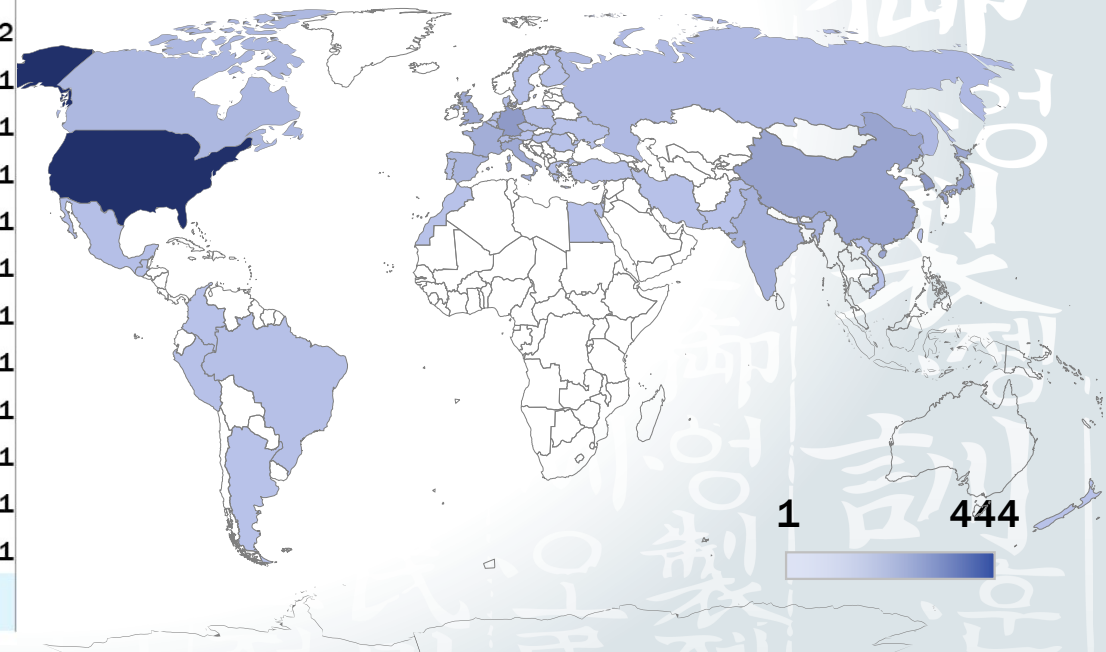
- **1,382** participants from 44 countries
- **84** invited speakers from 21 countries
- **661** poster presenters from 35 countries
- **17,266** cumulative visits to ZEP Metaverse for posters
- **1,578** posts at Slack (by June 1)

No.	Country	No. of Registrations	No.	Country	No. of Registrations
1	USA	445	23	Sweden	5
2	Korea, Republic of	126	24	Greece	5
3	Germany	121	25	Turkey	3
4	China	93	26	Finland	3
5	Japan	89	27	Peru	3
6	UK	81	28	Iran	3
7	Italy	76	29	Ukraine	2
8	France	63	30	Argentina	2
9	India	51	31	Vietnam	2
10	Spain	38	32	Hong Kong	2
11	Canada	32	33	Colombia	2
12	Russia	27	34	Hungary	1
13	Switzerland	17	35	Israel	1
14	Denmark	13	36	Egypt	1
15	Czech Republic	11	37	Slovakia Republic	1
16	Poland	10	38	Austria	1
17	Mexico	9	39	New Zealand	1
18	Brazil	9	40	Morocco	1
19	Netherlands	8	41	Pakistan	1
20	Portugal	7	42	Romania	1
21	Taiwan	7	43	Guatemala	1
22	Belgium	6	44	Macau	1
Total		1382			

## Registration Statistics

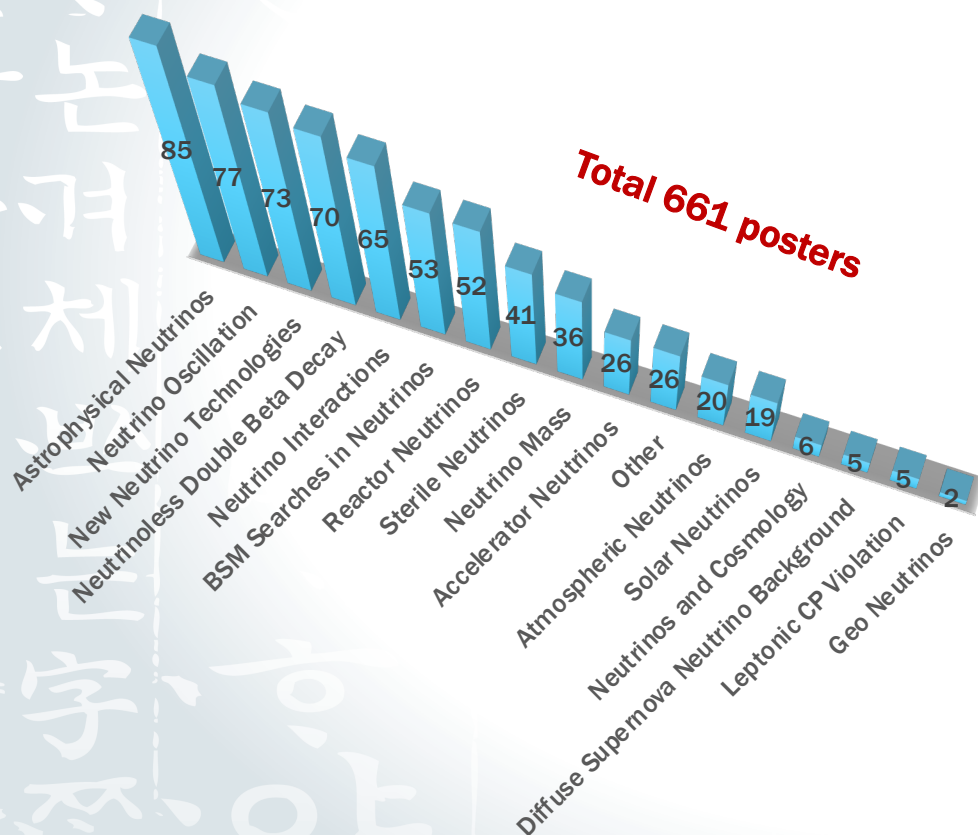
**1,382** participants  
(~25% female)  
from **44** countries

70 Euro registration fee effect?



# Posters

**661** posters presented in **17** topics from **35** countries



Topic	No. of posters
Astrophysical Neutrinos	85
Neutrino Oscillation	77
New Neutrino Technologies	73
Neutrinoless Double Beta Decay	70
Neutrino Interactions	65
BSM Searches in Neutrinos	53
Reactor Neutrinos	52
Sterile Neutrinos	41
Neutrino Mass	36
Accelerator Neutrinos	26
Other	26
Atmospheric Neutrinos	20
Solar Neutrinos	19
Neutrinos and Cosmology	6
Diffuse Supernova Neutrino Background	5
Leptonic CP Violation	5
Geo Neutrinos	2
<b>Total</b>	<b>661</b>



# Program

23

## Plenary Sessions

Opening Session	1
Sterile Nu I ~ III	3
$0\nu\beta\beta$ I ~ II	2
Reactor Nu I ~ II	2
Nu Mass	1
Accelerator Nu I ~ III	3
Atmospheric Nu	1
Solar/DSNB Nu	1
Astrophysical Nu I ~ II	2
Heavy Nu, R&D	1
Nu Interactions I ~ II	2
New Nu Tech.	1
Nu and Cosmology	1
BSM Nu	1
Closing Session	1
<b>Total</b>	<b>23</b>

8

## Poster Sessions

Poster I a ~ IV a	4
Poster I b ~ IV b	4
<b>Total</b>	<b>8</b>

1

## Public Talk

Public talk	1
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**84 plenary speakers**  
**60 male**  
**21 female**  
**3 no response**

**Total 32 sessions**

Time	May 30 (Mon) (KST)	May 31 (Tue) (KST)	June 1 (Wed) (KST)	June 2 (Thu) (KST)	June 3 (Fri) (KST)	June 4 (Sat) (KST)	Time
6:00		Poster I-b @Dirac	Poster I-b @Dirac	Poster II-b @Majorana	Poster IV-b @Majorana		7:00
7:00		Long Break: 90 min.	Long Break: 90 min.	Long Break: 90 min.	Long Break: 90 min.		8:00
8:00		S2: Sterile Nu II	S6: Reactor Nu I	S10: Accelerator Nu I	S14: Astrophysical Nu I	S18: Nu Interactions II	9:00
9:00		Break: 30 min.	Break: 30 min.	Break: 30 min.	Break: 30 min.	Break: 30 min.	10:00
10:00		S3: Sterile Nu III	S7: Reactor Nu II	S11: Accelerator Nu II	S15: Astrophysical Nu II	S19: New Nu Tech.	11:00
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The 50<sup>th</sup> Anniversary

**NEUTRINO 2022**

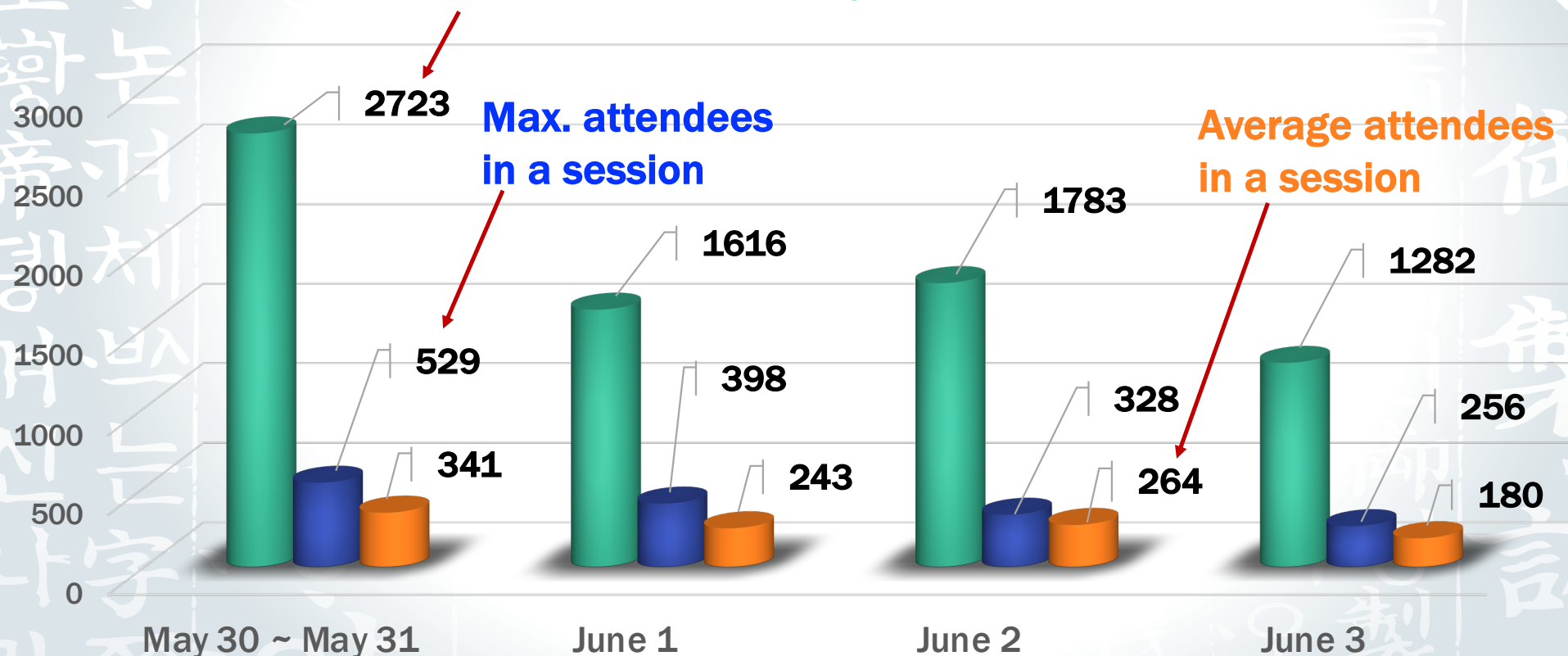
Virtual Seoul May 30 (Mon) - June 4 (Sat), 2022

# Daily Attendance - Thank you for staying!

Cumulative attendees/day

Max. attendees  
in a session

Average attendees  
in a session



# Virtual Platforms in NEUTRINO 2022



The 50<sup>th</sup> Anniversary  
**NEUTRINO 2022**  
Virtual Seoul May 30 (Mon) - June 4 (Sat), 2022

## Live Session Room

**6,649** cumulative visitors  
by June 3

### Live Session Room for participants

LIVE

Passcode: 4786

- Attention! If you are a speaker, the sound may be different from the audience.
- Please notice that all the content is recorded.
- The resolution improves as you move closer to the speaker.

#### How to send your message

- If you have technical issues, please contact the support team.
- Go to Slack channel.
- Go to Detailed Program.

## Poster Exhibition Page

**3,883** views  
at Poster Exhibition Page  
without Metaverse poster view count

Many thanks to “Chris Quigg”  
for the Opening Talk !



**Email from Chris on June 3<sup>rd</sup>:**

Neutrino 2022 is still in progress, but I want to congratulate you and your colleagues on the very fine organization. In my experience, everything has been very smooth and efficient, and I know that this requires mammoth efforts on the part of many people.

**Please convey my thanks and best wishes to the entire team.**



Many thanks to  
“Silvia Pascoli” & “Yifang Wang”  
for the Outlook Talks !





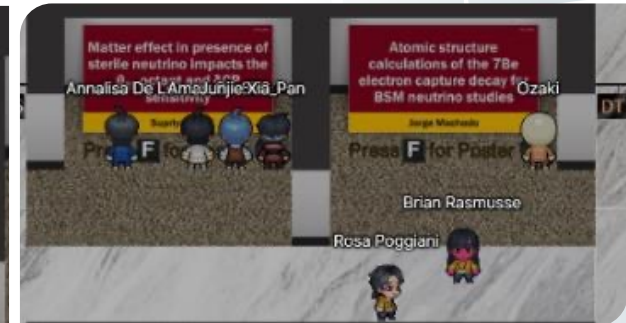
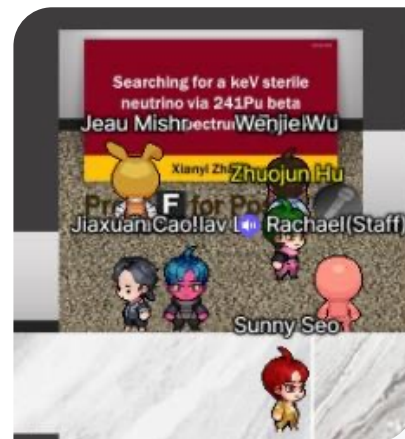
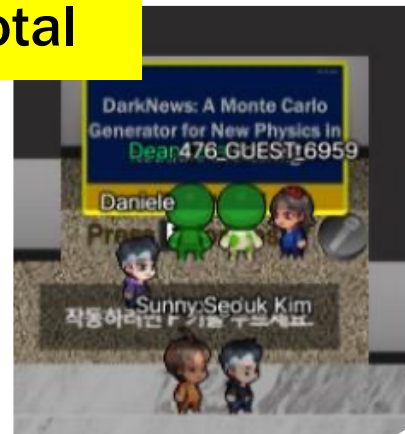
# Virtual Platforms in NEUTRINO 2022

The 50<sup>th</sup> Anniversary  
**NEUTRINO 2022**  
Virtual Seoul May 30 (Mon) - June 4 (Sat), 2022

**ZEP Metaverse**

9 story two buildings Dirac & Majorana for the poster session

**17,266** visits in total



# Guestbook Messages

Excellent experience! allows to have a different interaction. Excellent solution to the boring presentation style, definitely a must for the new era! Congratulations for your efforts, honored to be here.



What a great venue! Three thumbs up!!



I thought that the metaverse was the next best option in a pandemic situation, but now that I'm here, I think it's going to be the best solution in the future. Thank you for organizing such a great event and a great venue.



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It was a good venue. However, very few participants came to visit the posters. It may be just the general interest in the topic or in posters in general. It may be also the scheduled time (6am in Korean, midnight in Europe) or the saturated agenda.

Please leave messages in Guestbooks in each floor, ZEP Metaverse.



**NEUTRINO 2022**  
XXX International Conference on Neutrino Physics and Astrophysics  
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2015 노벨물리학상 수상  
카지타 타카아키 교수와 함께하는  
**Public Talk**

**Topic**  
Oscillating Neutrinos  
- a key to understanding the Universe  
진동하는 중성미자 - 우주를 이해하는 열쇠

—  
**2022. 6. 2. (목) 오후 5시**  
*Virtual Seoul*

카지타 타카아키  
Takaaki Kajita  
現 도쿄 대학교 교수



**Many thanks to “Kajita-san”!**

**5 pm June 2 (Th), KST**

**Thanks to Eung Jin Chun,**  
the session chair.

**# of attendees: ~300**  
( ~220 at ZOOM, ~80 at YouTube)

**There were many  
interesting questions !**

## Session Chairs

Opening: Sunny Seo

S1: Eligo Lisi

S2: Jon Link

S3: Janet Conrad

S4: Matteo Agostini

S5: Andrea Giuliani

S6: Jun Cao

S7: Adam Bernstein

S8: Guido Drexlin

S9: Mark D. Messier

S10: Hirohisa Tanaka

S11: Elizabeth Worcester

S12: Kimihiro Okamura

Public Talk: Eung Jin Chun

S13: Gabriel Orebi Gann

S14: Paschal Coyle

S15: Francis Halzen

S16: Manfred Lindner

S17: Mohammad Sajjad Athar

S18: Kate Scholberg

S19: Tsuyoshi Nakaya

S20: Yvonne Wong

S21: Sin Kyu Kang

Closing: Jong Hee Yoo

**Thank you all so much !**

## International Advisory Committee

Luis Alvarez-Ruso  
Alexander Barabash  
John Beacom  
Laura Baudis  
Chiara Brofferio  
Jun Cao  
Amol Dighe  
Andrea Giuliani  
M.C. Gonzalez-Garcia  
Srubabati Goswami  
Roxanne Guenette

Yoshinari Hayato  
Mark Hartz  
Sin Kyu Kang  
Yeongduk Kim  
Pedro Machodo  
Mary Hall Reno  
Alysia Marino  
Angelo Nucciotti  
Pedro Ochoa-Ricoux  
Gabriel Orebi Gann  
Marco Pallavicini

Jennifer Raaf  
Gioacchino Ranucci  
Mayly Sanchez  
Kate Scholberg  
David Sinclair  
Mariam Tortola  
Francesco Vissani  
Morgan Wascko  
Henry Wong  
Yvonne Wong  
Elizabeth Worcester  
Renata Zukanovich Funchal

**Thank you so much for helping us making Nu2022 program !**



# International Neutrino Commission (INC)

Jenni Adams  
Sidney Bludman  
Tom Bowles  
Steve Brice  
Arnon Dar  
Guido Drexlin  
Gary Feldman  
Ettore Fiorini  
Francis Halzen  
Cecilia Jarlskog  
Ed Kearns  
Toshio Kitagaki

Konrad Kleinknecht  
Takashi Kobayashi  
John Learned  
Manfred Lindner  
Ken Long  
Bill Louis  
Art McDonald  
Masayuki Nakahata  
Tsuyoshi Nakaya  
Vito Palladino

Stephen Parke (chair)  
Silvia Pascoli  
Herbert Pietschmann  
Matts Roos  
Norbert Schmitz  
Jack Schneps  
Yoichiro Suzuki  
Francois Vannucci  
Daniel Vignaud  
Franz von Feilitzsch  
Sam Zeller

**Thank you so much for choosing Seoul for Nu2022  
and also helping us making Nu2022 program !**

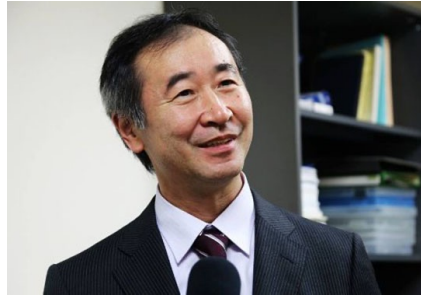
# The 50th Anniversary Committee



Francis Halzen



Cecilia Jarlskog



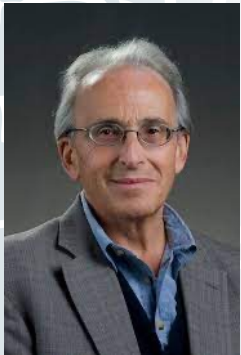
Takaaki Kajita



John Learned



Art McDonald



Jorge Morfin



Stephen Parke



Andras Patkos



Konrad Kleinknecht



Henry Sobel



Yoichiro Suzukis

Thank you so much for helping us  
preparing the 50th Anniversary Page!

## Poster Committee

Jianming Bian  
christian.buck  
Linda Cremonesi  
Mikhail Danilov  
Amol Dighe  
Stephen Dye  
Loredana Gastaldo  
Dmitry Gorbunov  
Vincente Guiseppe  
Mark Hartz

Yoshinari Hayato  
Patrick Huber  
Yong-Hamb Kim  
Joachim Kopp  
Yusuke Koshio  
Bryce Littlejohn  
William Louis  
Susanne Mertens  
Yasuhiro Nakajima  
J. Pedro Ochoa-Ricoux

Serguey Petcov  
Gioacchino Ranucci  
Kate Scholberg  
Goswami Srubabati  
Roger Wendell  
Walter Winter  
Yvonne Wong  
Elizabeth Worcester  
Michael Wurm  
Efremenko, Yuri

**Many thanks to you all for reviewing/accepting abstracts  
and selecting Best Posters !!**



# Neutrino 2022 Best Poster in Each Track

Toal 17 tracks

**T1: Neutrino Oscillation:** P0251, Thomas Wester, "Atmospheric Neutrino Oscillation Analysis with Super-Kamiokande"

**T2: CP violation:** P0424, Bingrong Yu, "Exploring Seesaw from SEFT in the Language of Invariant Thoery".

**T3: Nu mass:** P0420, Christine Claessens, "Tritium endpoint measurement and neutrino mass limit of Project 8 Phase II using Cyclotron Radiation Emission Spectroscopy (CRES)"

**T4: Onbb:** P0209, Alice Campani, "Recent results of the search for neutrinoless positron emitting electron capture of  $^{120}\text{Te}$  with CUORE"

**T5: Neutrino Interaction:** P0723, Samantha Sword-Fehlberg, "First Extraction of Single Differential Cross-Sections on  $^{40}\text{Ar}$  for CC2p Event Topologies in the MicroBooNE Detector"

**T6: Reactor Neutrinos:** P0668, Runze Zhao, "A New Method to Measure the High-energy Reactor Antineutrinos at Daya Bay"

**T7: Accelerator Nu:** P0392, Ciaran Hasnip, "The DUNE Neutrino PRISM"

**T8: Geo Nu:** P0344, Andrea Serafini, "Investigating Earth's mantle with antineutrinos"

# Neutrino 2022 Best Poster in Each Track

**T9: Atmospheric Nu: P0649, Mariam Rifai**, "Atmospheric neutrino physics in JUNO: reconstruction of GeV Interaction"

**T10: Solar Nu: P0083, Riccardo Biondi**, "Precision measurement of the Earth's orbit parameters with solar neutrinos in Borexino"

**T11: DSNB: P0661, Tomohiro Tano**, "Measurement of neutron-oxygen interaction cross section using neutron beam"

**T12: Astrophysical neutrino: P0073, Ersilia Guarini**, "Multimessenger detection prospects of gamma-ray burst afterglows"

**T13: Neutrinos and Cosmology P0241, Ivan Esteban**, "Gravitational CMB lensing illuminates neutrino interactions"

**T14: Sterile Nu: P0753, Xiangpan Ji**, "Search for a sterile neutrino at MicroBooNE using BNB and NuMI beams"

**T15: BSM in Neutrinos: P0402, Jose Carpio Dumler**, "Time-delayed Neutrino Emission from Supernovae as a Probe of DarkMatter-Neutrino Interactions"

**T16: New Tech.: P401, Holger Kluck**, "CRAB - Developing a sub-keV calibration technique for cryogenic detectors"

**T17: Other interesting neutrino physics: P0782, Luca Pagani**, "The final results from the ARTIE experiment"

# Neutrino 2022 “Final 6 Best Posters” (I)

## **T1: Neutrino Oscillation**

**P0251, Thomas Wester (Boston U.),**



"Atmospheric Neutrino Oscillation Analysis with Super-Kamiokande"

## **T3: Nu mass**

**P0420, Christine Claessens (Washington U.),**

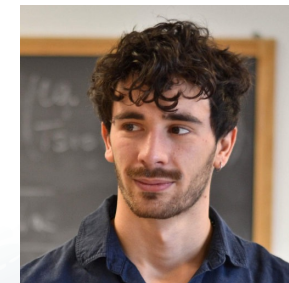
"Tritium endpoint measurement and neutrino mass limit of Project 8 Phase II using Cyclotron Radiation Emission Spectroscopy (CRES)"



## **T8: Geo Nu**

**P0344, Andrea Serafini (INFN & Padua),**

"Investigating Earth's mantle with antineutrinos"



# Neutrino 2022 “Final 6 Best Posters” (II)

## **T10: Solar Nu:**

**P0083, Riccardo Biondi (INFN & Gran Sasso),**

"Precision measurement of the Earth's orbit parameters with solar neutrinos in Borexino"



## **T12: Astrophysical neutrinos:**

**P0073, Ersilia Guarini (Niels Bohr Inst.),**

"Multimessenger detection prospects of gamma-ray burst afterglows"



## **T13: Neutrinos and Cosmology**

**P0241, Ivan Esteban (OSU),**

"Gravitational CMB lensing illuminates neutrino interactions"





# Neutrino 2022 Secretariat



The 50<sup>th</sup> Anniversary  
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## “InSession”



**Kyle Kim**  
Project Manager



**Abbey Jang**  
Coordinator



**Yebin Jang**  
Coordinator



- Without you, we couldn't open and finish Neutrino 2022.
- It has been really great working with you.

**Many thanks !!!**

[office@neutrino20222.org](mailto:office@neutrino20222.org)  
[sci@neutrino2022.org](mailto:sci@neutrino2022.org)

Thank you so much, LOC !

Myung Ki Cheoun  
Kihyeon Cho  
Eung Jin Chun  
Junghwan Goh  
Sang Hyeon Jang  
Kyungkwang Joo  
Sin Kyu Kang  
Doris Kim  
Hongjoo Kim  
Hyunsoo Kim  
Sang-Chul Kim  
Siyeon Kim

Tae-Jeong Kim  
Yeongduk Kim (Co-Chair)  
Pyungwon Ko  
Kyujin Kwak  
Hye-Sung Lee  
Kang Young Lee  
Moo Hyun Lee  
Myeong-Jae Lee  
Yongseok Oh  
Yoomin Oh  
Myeong Yeol Pac  
Inkyu Park

Jong-Chul Park  
Seong Chan Park  
Dongsu Ryu  
Sunny Seo (Co-Chair)  
Seodong Shin  
Jeonghyeon Song  
Byeongsu Yang  
Un-Ki Yang  
Hwidong Yoo  
Jonghee Yoo  
Intae Yu



# Special Thanks to LOC Executive Members



Eung Jin Chun



Sin Kyu Kang



Doris Kim



Yeongduk Kim



Inkyu Park



Sunny Seo



Un-Ki Yang



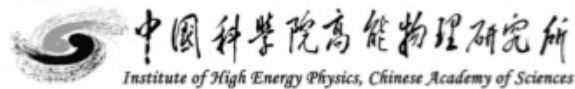
Jonghee Yoo



Intae Yu

- Decision Makings
- Indico system
- Online platforms
- Finances
- Advertisement
- Advisory
- Etc.

Thank you for Sponsoring Neutrino 2022 !



Fermilab



# Follow Up Schedule for NEUTRINO 2022



Category	Available until/after	Platforms	Main features
Plenary Talk Slides & Video Download	Until June 30, 2022  After June 30, 2022	Websites  Indico & ZENODO	Watching and Download recording of talks and talk slides
Poster Exhibition Page	Until June 30, 2022	Website	Viewing all the posters and available Q&A/replay board
Poster Session	Until June 30, 2022	ZEP Metaverse	Viewing all the posters
Slack	Open continuously. (searching is possible until June 14, 2022)	Slack	Q&A, Discussions, etc

- Nu2022 proceedings (= talks/posters themselves) in **ZENODO** with **DOI**.
- Before we upload talks/posters to ZENODO, minor modifications are allowed but not major ones, **by June 10 (F)**.





022  
(Sat), 2022

**We will update the Group Photo in Next Week. Upload your profile photo (< 3MB) in MyPage.**



Hope v continues !



The 50<sup>th</sup> Anniversary  
**NEUTRINO 2022**  
Virtual Seoul May 30 (Mon) - June 4 (Sat), 2022

Nu1972



Nu2022



Nu2072

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# NuInt 2022 (offline)

The 13th International Workshop on Neutrino-Nucleus Interactions in the Few GeV Region (NuInt 2022)

October 24-29, 2022

Seoul, Korea

<https://nuint22.org>



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# NEUTRINO 2022

XXX International Conference on Neutrino Physics and Astrophysics

*Virtual Seoul* May 30 (Mon) - June 4 (Sat), 2022



The 50<sup>th</sup> Anniversary

**NEUTRINO 2022**

*Virtual Seoul* May 30 (Mon) - June 4 (Sat), 2022



**Goodbye, Virtual Seoul 2022**  
**See you in Milano 2024 !!**