The NUFACT 2023 round table discussion

Thursday 24 August 2023 10:50-11:50

Theme:

DUNE and HyperK -- now, then... and later?

Mary Bishai
BNL, DUNE Spokesperson

Masato Shiozawa
ICRR Tokyo, HyperK Spokesperson

+ moderator: Alain Blondel (UNIGE Geneva, and LPNHE Paris)

Masato SHIOZAWA

1992 Entered the Graduate School of Science, The University of Tokyo. Participate in the Super-Kamiokande experiment.
1996 Start the Super-Kamiokande experiment. Study on atmospheric neutrino oscillations. Search for proton decay as the subject of his doctoral dissertation.
1998 Participate in the K2K neutrino oscillation experiment using a neutrino beam from the KEK proton accelerator, confirming neutrino oscillations by artificial neutrinos.
2009 Start of the T2K neutrino oscillation experiment using the neutrino beam from the J-PARC high-intensity accelerator. A third oscillation mode was discovered, following atmospheric neutrinos and solar neutrino oscillations.
2020 Start Hyper-Kamiokande construction.
2021 Co-spokesperson of the Hyper-K collaboration.
2022 Director of the Kamioka Observatory.

2001 Asahi Prize, "Discovery that neutrinos have mass," Group Award,
2015 joint winner Yoji Totsuka Prize, "Discovery of Electron Neutrino Appearance Phenomenon by Accelerator Muon Neutrino Beam,"
2015 Fundamental Physics Breakthrough Award, Super-K/K2K/T2K Group

Mary BISHAI

Experiments:
DUNE
MicroBooNE,
Daya Bay Reactor Neutrino Experiment,
Main Injector Neutrino Oscillation Search (MINOS),
Collider Detector at Fermilab (CDF II),
CLEO experiment.

https://www.bnl.gov/staff/mbishai

Dr. Bishai has served on several leading committees of the US Particle Physics community including the DOE/NSF High Energy Physics Advisory Panel (HEPAP) from 2013-2016 and was elected member-at-large of the American Physical Society's Division of Particle and Fields (DPF) Executive Committee from 2019-2022.

Dr. Bishai is committed to the development of a diverse and inclusive scientific workforce. She has mentored over 15 undergraduate interns through the US DOE SULI program program as well as 5 high school student interns through BNL OEP HSRP program. She is an active member and supporter of the African School of Fundamental Physics and Applications and has mentored several ASP alumni who have been accepted into Ph.D programs in the US and Europe.

Education

- Ph.D, Purdue University, 1999
- M.Sc, Purdue University, 1993
- BA (Physics), University of Colorado, Boulder, 1991

Professional Appointments

- DUNE Collaboration Co-spokesperson, 2023
- Chair, LBNF/DUNE Review Office, 2022
- Senior Physicist, BNL, 2015
- Project Scientist, Long-Baseline Neutrino Experiment, 2012-2015
- Physicist, BNL, 2008
- Associate Physicist, BNL, 2006
- Assistant Physicist, BNL, 2004
- Research Associate, Fermi National Accelerator Laboratory, 199
- Research Assistant, Purdue University, 1993
- Teaching Assistant, Purdue University, 1991

Alain BLONDEL

				prizes
1974-1979	PARIS	GARGAMELLE neutrino	Masters(NC), Diploma(Charm Baryon), PHD(Charm)	Bronze CNRS **
1979-1982	Berkeley	MARKII @ SPEAR&PEP	B lifetime, tau lifetime	
1983-1989	CERN	CDHS neutrino	NC/CC ratio → $\sin^2\theta_W$ → m_{top}	
1986-2001	CERN/CNRS	ALEPH @ LEP	N_ν , precision meast of Z mass with resonant beam polarization → m_{top}, m_{Higgs}	*****
1999-2013	Uni Geneva	Muon collider and neutrino factory, MICE experiment ("spokesmouse")		
2002-2007		K2K	+ HARP (particle production in target)	*
2002-today		T2K	+ NA61 (particle production in target), physco, $\nu_\mu \to \nu_e$, ND280 upgrade design+ SFGD	***
2011-today		FCCee	precision measurements for Higgs, EW, Flavour + HNL(≡ RHv) production	
2020-today		Retired (Honorary (Geneva) and emeritus professor (Paris))		

internet CV: https://artsci.case.edu/smat50/alain-blondel/

The round table is a moment of great interest in the workshop since it is an opportunity to organize exchange between the participants (including organizers of past and futur NUFACT workshops) and leading figures in the field.
This year the number of panelists is small in order to foster discussion among the participants.

The theme of the round table discussion this year is **'DUNE and HYPERK, now, then and later"**
Here is a possible list of possible subjects that might be addressed

A- preparation for the experiments, possible difficulties, nice realizations and ideas
-- far detector design and possible upgrades
-- near detector design and possible upgrades
-- beam design and possible upgrades
....

B- complementarity of the experiments. There are two aspects here:
-- performing the same set of measurements with different techniques; benefits, possible synergies and collaboration
-- different measurements that one of DUNE and HyperK can perform more specifically.
...

C- what might be the future of the field of neutrino experimental physics with accelerators beyond DUNE and HyperK (in preparation, at the same time or later)
-- dedicated neutrino cross-sections or flux-related experiments (NA61, EMPHATIC, EUNUBET, NUSTORM, others)
-- further long baseline experiments (ESSnuSB, KM3Net...)
-- collider "parasitic" experiments (such as FASER, MATHUSLA, etc.. at the LHC) or mainstream collider searches for right-handed neutrinos (in LHC experiments, FCC-ee as Z/H factory, FCC-hh, muon collider)
-- ...

1. Short presentations by
   -- Mary Bishai
   -- Masato Shiozawa

2. questions and answers in order of topics

DUNE and HYPERK, now, then and later

A- preparation for the experiments, possible difficulties, nice realizations and ideas

-- far detector design and possible upgrades

-- near detector design and possible upgrades

-- beam design and possible upgrades

DUNE and HYPERK, now, then and later

A- questions

-- trivial question: what is the real fiducial volume of DUNE? HyperK?

-- What is the status of approval or construction of the new Water Cherenkov near detector for HyperK? will it start at the same time as HyperK or later?

-- similar question for the near detector suite of DUNE?

DUNE and HYPERK, now, then and later

B- complementarity of the experiments. There are two aspects here:

-- performing the same set of measurements with different techniques; benefits, possible synergies and collaboration

-- different measurements that one of DUNE and HyperK can perform more specifically.

DUNE and HYPERK, now, then and later

C- Besides or beyond DUNE and HyperK (in preparation, at the same time or later)

-- dedicated neutrino cross-sections or flux-related experiments (NA61, EMPHATIC, EUNUBET, NUSTORM, others)

-- further long baseline experiments (KNO, ESSnuSB, KM3Net...)

-- (AB) collider “parasitic” experiments (such as FASER, etc.. at the LHC) or mainstream collider searches for RH neutrinos (in LHC experiments, FCC-ee as Z/H factory, FCC-hh, muon collider)

DUNE and HYPERK, now, then and later

C- Questions

Un-ki Yang, Seoul National University, ukyang@snu.ac.kr

QUESTION: The understanding on the neutrino-nucleus interaction is still poor. Minerva data taking is over. In order to make precision measurements of the CP violation by the Hyper-K and DUNE experiments, what type of measurements are still required and do we need any dedicated experiment for precision neutrino cross section measurement in future?

DUNE and HYPERK, now, then and later

C- Questions

QUESTION: There are discussions of a revived muon collider program both at CERN and Ferminlab. Are the neutrino experiments HyperK and DUNE supporting the possibility of NUSTORM for measurements of the v_e and v_mu cross-sections in dedicated detectors? Is it a problem if these measurements come after the LBL experiments started data taking?

DUNE and HYPERK, now, then and later

C- Questions

QUESTION: Are DUNE and HyperK collaborating for the measurements of hadron production in the targets? Is there a an agreement of DUNE and HyperK with the experiments, to acknowledge these contributions to the experiments as was the case for HARP wrt K2K and T2K with NA61?

DUNE and HYPERK, now, then and later

C- Questions

QUESTION: What is the relationship between KNO and the HyperK collaboration, will this be one integrated project? Is an international agreement necessary to use ‘Japanese neutrinos’ in Korea?

DUNE and HYPERK, now, then and later

C- Questions

Un-ki Yang, Seoul National University, ukyang@snu.ac.kr

What can neutrino-beam experiments teach about about the origin of neutrino masses? Have we planned enough physics program to understand the origin of neutrino mass? Should we more closely work with LHC and future collider community?

DUNE and HYPERK, now, then and later

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Un-ki Yang, Seoul National University, ukyang@snu.ac.kr

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