Neutrino Town Hall Meeting

Patrick Huber, Kate Scholberg, Elizabeth Worcester Neutrino Frontier Conveners

07/17/20

This meeting is conducted according to the community guidelines to be found here https://snowmass21.org/cpcg/start

SNOWMASS*

- . SNOWMASS is a community planning event organized by the Division of Particles and Fields (DPF) of the American Physical Society
- Frequency is about once every 7-10 years, effectively making this a decadal planning exercise
- It is year-long process which will end with a report to P5
- The goal is to formulate a "vision for the future of particle physics in the U.S. and its international partners"
- International participation and contribution are explicitly desired.

*The name is historic and relates to the place where some earlier instances, when we still could travel, took place, Snowmass, CO.

Particle Physics Project Priorization Panel (P5)

- P5 is a temporary sub-panel of the High-Energy Physics Advisory Panel (HEPAP).
- . HEPAP was jointly chartered by DOE and NSF in 2000 and operates under the rules of Federal Advisory Committee Act (FACA)
- There is an expectation that DOE and NSF will closely stick to HEPAP recommendations and thus, also P5 recommendations.
- P5 has direct and lasting impact on federal funding levels
- P5 deliberates for about 1 year and the SNOWMASS report is crucial input, other input includes: Long-range plan for nuclear science, Decadal Survey on Astronomy and Astrophysics, HEPAP Accelerator R&D sub-panel report

SNOWMASS = Your opportunity to provide input

SNOWMASS Advisory Group

- DPF Executive Committee
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 Prisca Cushman
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 Representatives from other Divisions
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- Other Executive Committee members
- International Community Representatives
- Editor
- Communication and Technical Liaisons

Full list of names at snowmass21.org

Ten Frontiers

- Energy
- Neutrino
- Rare Processes and Precision Measurement
- Cosmic

- Accelerator
- Instrumentation
- Computational
- Underground
- Community Engagement

• Theory

Each frontier has three conveners and there are liasions as appropriate

Neutrino Frontier

Co-conveners



Patrick Huber Virginia Tech



Duke University



Elizabeth Worcester BNL

Topical Group	Co-Conveners			
Neutrino Oscillations	Peter Denton	Megan Friend	Mark Messier	Hiro Tanaka
Sterile Neutrinos	Georgia Karagiorgi	Bryce Littlejohn	Pedro Machado	Alex Sousa
Beyond the SM	Pilar Coloma	Lisa Koerner	lan Shoemaker	Jae Yu
Neutrinos from Natural Sources	Yusuke Koshio	Gabriel Orebi Gann	Erin O'Sullivan	Irene Tamborra
Neutrino Properties	Carlo Giunti	Ben Jones	Lisa Kaufman	Diana Parno
Neutrino Cross Sections	Jonathan Asaadi	Baha Balantekin	Kendall Mahn	Jason Newby
Nuclear Safeguards and Other Applications	Nathaniel Bowden	Jon Link	Wei Wang	
Theory of Neutrino Physics	André de Gouvêa	Irina Mocioiu	Saori Pastore	Louis Strigari
Artificial Neutrino Sources	Laura Fields	Alysia Marino	Pedro Ochoa	Josh Spitz
Neutrino Detectors	Josh Klein	Ana Machado	Dave Schmitz	Raimund Strauss

Written Input

- Letters of Interest (LOI)
- 2 pages (!), due August 30
- Purpose is to facilitate planning by conveners and topical conveners
- Not a prerequisite for a contribution
- Cross cuts will be handled
 appropriately

- Contributions
- Any length, but executive summary strongly encouraged for longer ones.
- Final versions due by July 31, 2021
- Submission to arXiv first
- Will be part of the overall SNOWMASS output

Where to find information

- Snowmass21.org starting point for all searches
- Calendar:
- snowmass21.org/meetings/start
- Slides etc.
- indico.fnal.gov/category/1098/

- Mailing list (for announcements)
- <u>snowmass-neutrino-frontier@fnal.gov</u>

- Slack channel (for discussions)
- snowmass21.slack.com
- #neutrinos

Plan for Today

09:00	Introduction	Patrick Huber
		09:00 - 09:15
	Computing Frontier Perspective	Alex Himmel
		09:15 - 09:25
	European Strategy Report	Joachim Kopp
		09:25 - 09:45
Snowmass E	Snowmass Early Career Neutrino Coordination	Erin Conley et al.
		09:45 - 09:50
Physics Goals and Mot	Physics Goals and Motivation	
10:00		
		09:50 - 10:25
	Break	
		10:25 - 10:35
	Theory and Neutrinos	
11:00		10:35 - 11:10
	Structure of the Program	
		11.10 11.15
		11:10 - 11:45
	General Comments, Open Mic, Discussion	
		11:45 - 12:00

12:00

Panelists

Physics Goals

Andre de Gouvea Chris Marshall Josh Spitz Lindley Winslow Theory of Neutrinos

Alex Friedland Carlo Giunti Irene Tamborra Jessica Taylor

Moderator:Moderator:Elizabeth WorcesterPatrick HuberNote takers: Cindy Lin and Louis Strigari

Structure of Program

Jonathan Asaadi Ryan Patterson Elisa Resconi Grayson Rich

Moderator: Kate Scholberg

Thanks to all the panelists and note takers!

Physics Goals and Motivation

How are the limitations of existing neutrino sources and detectors affectingourphysics reach?

What kinds of new physics searches should we prioritize, especiallyconsideringthat there are no decisive hints regarding what lies beyondthe standard modelfrom other fundamental physics experiments?

What can neutrino physics do for other fields of science and technology? **Theory and Neutrinos**

What is the theory motivation to go beyond the current program?

How can theorists best support the experimental program?

Structure of the Program

How do we maintain the necessary breadth of physics, including smaller experiments, auxiliary measurements, and activities within larger projects?

How can we ensure that experimental and theoretical efforts have enough resources to pursue questions of significant interest, even if those questions cross the boundaries of Frontiers or funding umbrellas?

Questions from the community

Physics:

Masoom Singh: What new awaits the young neutrino physicists, when we have already entered the precision era?

Theory:

Ratul Swarno: How close are we in uncovering the physics behind WIMPS and other dark matter/energy candidates. Much thanks!

Structure of the program:

Scott Shaw: Do you foresee a convergence of neutrino detection and dark matter detection resources, or are the two areas headed in different directions?

Questions from the community

Structure of the program, continued:

Adam Bernstein: What importance do the conveners attach to cross-disciplinary research efforts with activities outside of fundamental research, such as accelerator development, advanced photosensors, neutrino detection for nonprolferation, and similar applied research ?

Alan Stone: What are the major obstacles for broadening the scientific understanding and participation in high energy neutrino physics?

Sunny Seo: The Covid-19 has been globally affecting people's life/health and economy. It has changed our daily life a lot and we still do not know when it will be under-control. Therefore, I just wonder what is the impact of Covid-19 on science in USA. Is there any possibility that USA funding agency stop funding big projects ? Or, oppositely, the government stimulates science even more ? In any case, I think some sort of good options and/or proactive strategies are needed in the neutrino field in the era of Covid-19 and the following economic crisis.