

European Neutrino Town meeting and ESPP 2019 preparation

22-24 October 2018, at CERN

Bulletin number 2

Dear colleagues,

The European Neutrino Town meeting is taking shape, please have a look at the Web site

<https://indico.cern.ch/event/740296/>

Please register, and if needed book your CERN hostel room using the form available from the web site, at your earliest convenience.

1. Posters and input documents

Since we cannot in two days propose a complete panorama of the field we would like to strongly encourage neutrino physicists in Europe to present posters. Poster abstracts can be submitted through the website, **the submission deadline is September 30, 2018.**

The number of posters will be limited.

2. **Hot questions and proposals:** If people have important messages/ideas they would like to communicate they should submit an abstract and we may be in a position to schedule an oral presentation. A poster should also be prepared in that case.

3. Scientific Panels

We are organizing preparatory homework by four panels of members of the community.

-- *Panel 1. Standard (active) neutrino oscillations*

-- *Panel 2. Beyond PMNS (Majorana and/or Dirac mass term, Heavy Neutral lepton searches from meV to ZeV, NSI, etc...)*

-- *Panel 3. Neutrinos and the Universe (N_ν , m_ν , BAU, proton decay etc..)*

-- *Panel 4. Ancillary measurements (cross-sections, Nustorm, NA61, etc.)*

The panels will report during the meeting and prepare a short summary document. The conclusions will be discussed in the last afternoon of the meeting. As soon as they are finalized the names of the members of the panels will be posted on the indico site of the workshop. Preliminary panel charges are appended below.

We are looking forward to seeing you at CERN

The local organizers,

Alain Blondel, Albert de Roeck, Joachim Kopp, Marzio Nessi

Appendix: charges to EU town meeting panels

-- Panel 1. Standard (active) neutrino oscillations

The panel should take stock and summarize the respective properties of the "present" LBL program (T2K+SK+NOvA, JUNO, T2K upgrade, HyperK and DUNE, atmospheric neutrino experiments).

Questions to address are for instance:

- What are the relevant physics questions to be addressed by the LBL program?
- In physics terms, identifying and quantify who measures what and how well?
- What is the complementarity in quantitative and qualitative terms and under which time scale?
- What risks are involved (technological and physics-related)?
- What is needed from the theory community? What can we learn with increasing precision on the measurements?
- What would be a continuation of that program in the long term what are big issues that could require a parallel experimental program. (Complementarity and possible synergies)

-- Panel 2. Beyond PMNS (Majorana and/or Dirac mass term, Heavy Neutral lepton from meV to ZeV, NSI, etc...)

These experimental questions concerning the nature of neutrino masses might take a growing importance in the future. Possible questions to address:

- Which extensions of the SM can we probe (Majorana masses, light and heavy sterile neutrinos, neutrinos as dark matter), and how far should/can experiment reach?
- What are the relevant experiments (0nu2beta, SBL oscillations, SHiP and other fixed-target experiments, LHC and future colliders). What are the synergies between experiments?
- What is needed from the theory community?
What risks are involved (technological and physics-related)? How do you see this field develop?

-- Panel 3. Neutrinos and the Universe (N_ν , m_ν , BAU, GUTs proton decay, neutrino astronomy&cosmology etc..)

These questions connect neutrinos and underground experiments to cosmology and astrophysics, and should be clarified as they constitute one of the most fundamental motivations for neutrino physics.

- What are the relevant questions (neutrino masses, number of neutrino species, leptogenesis/baryogenesis, origin of UHE neutrinos, ...)
- What are the relevant experiments, measurements, and observations now and in the future (CMB, BBN, Neutrino Telescopes, KATRIN, Project 8, ...)
- What is needed from the theory community?
- What is the complementarity between different approaches?
- What risks are involved (technological and physics-related)?

-- Panel 4. Ancillary measurements (cross-sections, Nustorm, NA61, etc.)

As the precision of long baseline experiments improves, Ancillary measurements of neutrino cross-sections and fluxes will become more and more important.

Questions to address are for instance:

- What are the requirements and opportunities raised by the LBL, SBL, and other neutrino programs: neutrino fluxes and neutrino cross sections, energy response function and calibration, for $(\nu_e/\nu_\mu/\nu_\tau)$? ...)
- What is their relevance to other neutrino experiments (e.g. LBL)?
- What are the relevant experiments (NA61 and other hadroproduction, near detectors, NUPRISM, HPTPC, NuSTORM, ...)?
- What is needed from the theory community?
- What is the complementarity between different approaches?
- What risks are involved (technological and physics-related)?