Spokesperson report
OPERA Collaboration Meeting
Napoli, 25-26 October 2016

Giovanni De Lellis

Report of LNGS Committee, April 2016

The Scientific Committee is pleased of the successful conclusion of the operation of the OPERA detector and of the status of the decommissioning.
The SC expects a final report from the collaboration by Spring 2017 (or anytime earlier to the collaboration convenience). This report should include a summary of the project and the major scientific and technical accomplishments. A list of all publications from the project should also be included.

Report of the SPSC meeting, June 2016

- The Committee **is pleased** with the steady progress achieved by the OPERA Collaboration in their neutrino oscillation analyses and their cosmic ray studies.

- The SPSC **looks forward to** the final results from the OPERA data where all the information provided by the three neutrino flavours is merged / which includes all findings on the three neutrino flavours.

- The SPSC **recognises** the high scientific value of the OPERA neutrino samples and **notes with pleasure** the steps taken by Collaboration and CERN towards a long-term storage of the OPERA data and analysis tools.

STATUS OF DATA ANALYSIS

- ~7100 located interactions and ~6700 decay searched (see Sato-san talk)
- Define the OPERA final sample at this meeting, to be published at the occasion of the next paper (nu_e) and use it for Winter Conferences and all the forthcoming publications

Machine learning techniques

- Yandex division for CERN experiments
- Yandex School of data analysis: visiting researchers in Naples
- Emulsion reconstruction is a challenging task: huge information not fully exploited
- Studies of possible improvements in the OPERA emulsion reconstruction at different levels:
  - Shower reconstruction and energy measurement
  - Event location in presence of showers (difficult CS to brick connection and scan-back phase)
- First attempts reported at this meeting
- Quantify the gain and apply to data

Oscillation physics

- Uniqueness of OPERA: detect all three flavour at the same time
- Combine with tau neutrino appearance, electron appearance and muon neutrino disappearance
- First measurement of Δm^2 and matrix elements with appearance
- Sterile neutrino search in the $\nu_\mu \rightarrow \nu_e$ channel (3x larger sample w.r.t. the work published in 2013)
- Sterile neutrino search in the $\nu_\mu \rightarrow \nu_\tau$ channel (one more candidate and larger statistics)

ν_τ and side analyses

- Measurement of ν_τ cross-section: DONUT (9 events and 1.5 background), a mixture of neutrino and anti-neutrinos and a larger uncertainty on the tau neutrino flux
  - Our flux uncertainty equal to muon neutrino
  - From oscillation → practically tau neutrino only
  - Our 5 events could be more valuable than DONUT ones
- Other topics
  - Study of the annual modulation of cosmic-rays
  - Multiplicity studies (Cagin)
  - New ideas?

Timeline for data analysis

- Timescale set by the final presentation to Scientific Committees (April at LNGS and June at CERN)
- At least ν_e paper and the combined ν_e and ν_τ
- Dedicated analyses and particular improvements could be published also later on

Data preservation at CERN

- First meeting with Jamie Shiers at CERN on Dec 18th 2015
- Our data < 100 TB (10 tapes) equivalent to a LEP exp
- LEP support granted until 2030 → support OPERA for the next 30 years
- Green light in January 2016 from CERN to the OPERA data preservation
- Cristiano has started concrete actions (see his report)
- Data copy from Lyon to CERN (faster)
- W/R access to IN2P3 DB until June 2017, only Read mode afterwards (important to complete the data publication soon)

Open data access

- Discussion with the head of open data access at CERN, willing to include OPERA data among the open data
- Educational purposes
- Notable examples (more advanced) at CERN: CMS and LHCb (see Andrey's talk)
- A disclaimer for the data release
  - "The open data are released under the Creative Commons CC0 waiver. Neither Open Data Portal nor CERN endorse any works, scientific or otherwise, produced using these data.
  - All releases will have a unique DOI that you are requested to cite in any applications or publications."
- Set-up a working group made of Cagin, Cristiano, GDL, Komatsu-san, Sato-san, Sergey

Open data access

- Identified a sample of muon neutrino located interactions where more information is stored, from multiplicity studies (Cagin)
- Cagin finalising the sample and providing it to Sergey for the event display
- Event display mandatory for educational purposes: it should be launched from a Browser and contain both the electronic detector and the emulsion tracks
- Significant modification to our display (Browser driven). Only emulsion tracks at the primary vertex is given, without all the segments attached

Next meetings

- Collaboration meetings in 2017 to be defined
- Regular Analysis meetings organized ~ monthly
- Committees:
  - LNGSC, final report expected in April 2017
  - SPSC, final report in June 2017