

REPORT from the  
International Neutrino Commission  
Meeting of  
4 June 2014, Boston, Massachusetts  
and

A Few “Highlights” from Early  
Neutrino XXXX “History”

J. Schneps

# ‘Official’ List

## INTERNATIONAL CONFERENCE ON NEUTRINO PHYSICS AND ASTROPHYSICS

- |  |                              |   |                                 |
|--|------------------------------|---|---------------------------------|
| 1. NEUTRINO 1972<br>George Marx*                     | Balaton, Hungary<br>139      | 15. NEUTRINO 1992<br>Angel Morales*                       | Granada, Spain<br>261           |
| 2. NEUTRINO 1974<br>Sidney Bludman                   | Philadelphia, PA, USA<br>??? | 16. NEUTRINO 1994<br>Arnon Dar                            | Eilat, Israel<br>288            |
| 3. NEUTRINO 1975<br>George Marx *                    | Balaton, Hungary<br>171      | 17. NEUTRINO 1996<br>Matts Roos                           | Helsinki, Finland<br>308        |
| 4. NEUTRINO 1976<br>Helmut Faissner*                 | Aachen, Germany<br>267       | 18. NEUTRINO 1998<br>Yoichiro Suzuki, Yoji Totsuka*       | Takayama, Japan<br>339          |
| 5. NEUTRINO 1977<br>Markov*, Tavkhelidze*, Zatsepin* | Elbrus, USSR<br>209          | 19. NEUTRINO 2000<br>Art McDonald                         | Sudbury, Canada<br>395          |
| 6. NEUTRINO 1978<br>Earle Fowler*                    | Lafayette, IN, USA<br>264    | 20. NEUTRINO 2002<br>Franz v. Feilitzsch, Norbert Schmitz | Munich, Germany<br>410          |
| 7. NEUTRINO 1979<br>Cecilia Jarlskog                 | Bergen, Norway<br>252        | 21. NEUTRINO 2004<br>François Vannucci, Daniel Vignaud    | Paris, France<br>520            |
| 8. NEUTRINO 1980<br>Ettore Fiorini                   | Erice, Italy<br>~100         | 22. NEUTRINO 2006<br>Thomas Bowles                        | Santa Fe, NM, USA<br>~450       |
| 9. NEUTRINO 1981<br>Vincent Peterson *               | Maui, Hawaii, USA<br>191     | 23. NEUTRINO 2008<br>J. Adams, F. Halzen, S. Parke        | Christchurch, N. Zealand<br>294 |
| 10. NEUTRINO 1982<br>Deszo Kiss*, George Marx*       | Balaton, Hungary<br>199      | 24. NEUTRINO 2010<br>George Tzanakos*                     | Athens, Greece<br>455           |
| 11. NEUTRINO 1984<br>Konrad Kleinknecht              | Nordkirchen Germany<br>232   | 25. NEUTRINO 2012<br>T. Kobayashi, M. Nakahata, T. Nakaya | Kyoto, Japan<br>599             |
| 12. NEUTRINO 1986<br>Toshio Kitagaki                 | Sendai, Japan<br>230         | 26. NEUTRINO 2014<br>Gary Feldman, Ed Kearns              | Boston, MA, USA<br>539          |
| 13. NEUTRINO 1988<br>Jacob Schneps                   | Boston, MA, USA<br>334       |   |                                 |
| 14. NEUTRINO 1990<br>Klaus Winter                    | Geneva, Switzerland<br>339   |   |                                 |

\* Deceased

# PRELUDES and NUMEROLOGY

Proceedings of NEUTRINO 1972 (1st), it was called the 4<sup>th</sup>.  
3 previous conferences, now called preludes; 1965, 1968, 1970.

Proceedings of NEUTRINO 1981 : Introduction – it's the 11<sup>th</sup>. Closing talk – it became the 9<sup>th</sup>.

The International Neutrino Commission defined 1972 as the 1<sup>st</sup>.

What and where were these three preludes?

1965, CERN: “Informal Conference on Experimental Neutrino Physics”

The complete Proceedings can be found on the web! 86 attended.

1968, Moscow: Mainly neutrino astrophysics. Proceedings?

1970, Cortona, Italy: Mainly neutrino astrophysics. Proceedings?

# (Un)Highlights Over the Years

1965 – V. Weisskopf, Director General, CERN

“This conference is an historic event. I do not think there was ever a conference on neutrinos, so let us be conscious of something new in this world.”

T.D. Lee: In 2 years hardware used in neutrino physics increased a factor of 10 in mass; this extrapolates to the total mass of the earth in about forty years. (he was right).

1972 - Weisskopf : Salam-Weinberg model has issues, e.g., zero masses for the fermions (but there is this possibility of a scalar field), it also predicts neutral currents (found just a year later).

1974 – Feynman: The solar neutrino problem is only 1.5 standard deviations off some solar models, so no need to discuss it here.

1975 – First evidence from SLAC for the tau lepton presented (but few believed it).

Okun: On theory, “perhaps a model with 6x3 colored quarks would explain better what we see, however, these models look pretty ugly, so many [of us] do not believe in them”.

1976 – It is noted that A. Mann and H. Primakoff are proposing a long baseline neutrino beam, 1,000 km, Fermilab to Quebec.

Phys.Rev. 1977. (They were ~40 years ahead of their time).

Solar neutrinos, we don't understand them.

1978 – Primakoff: Are there neutrino oscillations? and if so do they exhibit CP non-conservation? (36 years ago! We're still asking, but when?)

1979 – Where is the top quark? Best guesses are  $3 < m_t < 15$  GeV (a little bit off).

1980 – ITEP measuring  $\nu_e$  mass, tritium  $\beta$ -decay.  $14 < m_\nu < 46$  eV!!

1984 – UA1(W,Z 1983) Rubbia reports 6 top candidates, mass 30 to 50 GeV, but no claim; However,

Steinberger summary: “This conference was particularly honoured to be selected as the historic site for the first presentation of the UA1 evidence for the existence of top quarks and a rough measure of their mass.”

1986 – ITEP :  $17 < m_\nu < 40$  eV . But, 3 new exps. give  $m_\nu < 18$ -30 eV. Solar  $\nu$ 's, emergence of the MSW matter effect as an explanation.

1988 - Supernova 1987a. L. Okun predicts the next Supernova in our galaxy: date -  $2003 \pm 15$  A.D. (note the minus sign).

ITEP:  $m_{\nu_e} = 26 \pm 6$  eV; other experiments:  $m_{\nu_e} < 32$  eV.

Kamiokande reported atmospheric  $\nu_\mu$  deficit , suggested  $\nu_\mu \rightarrow \nu_\tau$  oscillations (not taken seriously by many).

1990 – LEP: The Z width fits best to 3 neutrinos. New result from a gaseous tritium source gave  $m_\nu < 9.4$  eV. No report from ITEP.

1992 – The concluding talk by De Rujula, entitled “Inconclusive Talk”, was (properly?) not published.

1996 - Ellis: dramatic result from LSND (1995) needs checking

1998 – SuperKamiokande confirms atmospheric  $\nu$  oscillations.

2000 – 2002 --First observation of solar neutrino CC's and NC's by SNO. Confirmed solar neutrino oscillations.

$\nu_\tau$  – First direct detection.

Confirm or reject LSND (still alive) – MiniBooNe will do it.

21<sup>st</sup> Century – You've been hearing all about that this week

(a more complete history will appear in the Proceedings)

SO, TO THE FUTURE

# Attending the INC meeting of 4 June 2014

Gary Feldman – NEUTRINO 2014, Boston

Ettore Fiorini - NEUTRINO 1980, Erice

Ed Kearns – NEUTRINO 2014, Boston

John Learned – NEUTRINO 1981. Hawaii

William Louis – NEUTRINO 2006, Santa Fe

Masayuki Nakahata - NEUTRINO 2012, Kyoto

Tsuyoshi Nakaya - NEUTRINO 2012, Kyoto

Vittorio Palladino – WIN workshops

Stephen Parke - NEUTRINO 2008, Christchurch  
(chair-elect, effective at close of NEUTRINO 2014)

Norbert Schmitz – NEUTRINO 2002, Munich

Jacob Schneps (chair) - NEUTRINO 1988, Boston

Yoichiro Suzuki - NEUTRINO 1998, Takayama

François Vannucci - NEUTRINO 2004, Paris



# The MEETING:Agenda & Discussion

1. We had a report from Gary Feldman and Ed Kearns on NEUTRINO 2014 and congratulated them and the Local Organizing Committee for a memorable conference.

## Highlights –

63 talks:30(Europe),23(N. America),10(Asia/Oceania)

287 Posters

551 Participants

And a balanced budget

2. Ken Long gave an update on planning for NEUTRINO 2016 in London - organization, facilities, costs and -- excursions. It's coming along very well.
3. Manfred Lindner and Guido Drexlin gave us an update on planning for NEUTRINO 2018 in Heidelberg and that is also going well.
4. We heard several proposals for NEUTRINO 2020 and beyond:
  - Steven Brice presented a proposal on behalf of Chicago or Minneapolis, the American Neutrino Heartland.
  - Soo-Bong Kim presented a proposal for Seoul in Korea.
  - Ettore Fiorini presented a proposal on behalf of the Università di Milano.
  - Wei Wang presented a proposal for Guangzhou in China.

Ken Long,  
Imperial  
College  
(Chair)

**NEUTRINO2016**

**SOUTH KENSINGTON, LONDON**

**XXVII INTERNATIONAL  
CONFERENCE ON NEUTRINO  
PHYSICS AND ASTROPHYSICS**

**4–9 JULY 2016**

<http://neutrino2016.iopconfs.org>

# NEUTRINO 2018 in Heidelberg

Manfred Lindner , MPI Heidelberg(Chair)

Guido Drexlin, Karlsruhe, (Co-chair)





# Neutrino 2020 - Chicago

## in the American Neutrino Heartland

M. Marshak (Minnesota) and J. Morfin (Fermilab)



# Future Conferences

Given that new experiments in neutrino physics now have time scales of the order 20 years and longer we can take a look what things may look like over that period for the Neutrino conferences. Tentative outline.

2016 London

2018 Heidelberg

2020 Chicago

2022 Asia-Pacific

2024 Europe

2026 Americas

2028 Asia-Pacific

2030 100th Anniversary of Pauli's prediction

etc.

We have an Expression of  
Interest and have  
reserved this one:

# NEUTRINO 2030

(PAULI NEUTRINO  
CENTENNIAL)

# Zurich

# André Rubbia

(to be reviewed in 2024)



Two years ago I told you I would be stepping down as chair of the INC at the end of NEUTRINO 2014 so that moment is quickly arriving. Succeeding me will be someone most of you know, Stephen Parke, so from now on all complaints, advice, etc. can be directed to him. So please welcome Stephen now as the new chair of the INC.