Contribution ID: 48

GALLEX/GNO: Context and recollections

Tuesday 12 June 2018 09:00 (30 minutes)

The pioneering Homestake Chlorine Solar Neutrino Experiment of Ray Davis detected only at a level of about 1/3 of what was roughly expected from the Standard Solar Model for B8-neutrinos. This established the "Solar Neutrino Problem" (SNP).

The deficit could have been caused either:

- by deviations due to an incomplete or false description of the solar interior by the standard solar model (SSM) and/or by inaccurate input parameters: - astrophysical solution of the SNP –

or:

- by non-standard neutrino properties: - particle physics solution of the SNP -

(like, e.g. non-zero neutrino mass at the root of neutrino flavor oscillations).

If a significant deficit would be observed for pp-neutrinos, one could rule out the astrophysical solution since their flux at origin is directly fixed to the well-known solar luminosity. pp-neutrinos are by far the most abundant solar neutrinos, yet their energy is very low (<420 keV). This demands a detection reaction with very low threshold. The only practical option was Ga71(v, e-)Ge71.

The GALLEX experiment, a big technological challenge, was the solution. Here I will recall in the historical context the GALLEX/GNO discovery of solar pp-neutrinos in 1992 and the first assurance of non-zero neutrino mass (most probably related to neutrino flavor oscillations).

GALLEX/GNO collected observational solar neutrino data at the Laboratori Nazionali del Gran Sasso (LNGS) from 5/1991 through 4/2003. I will summarize the milestones of the project and connect them with some personal recollections.

Primary author: Prof. KIRSTEN, Till (Max-Planck-Institut für Kernphysik)

Presenter: Prof. KIRSTEN, Till (Max-Planck-Institut für Kernphysik)

Session Classification: From Radiochemical to Real-time Detection of Solar Neutrinos