

## **Aims of the Neutrino Workshop**

### ***To begin the process of establishing a roadmap for a coherent European participation in future Neutrino Physics***

The European Strategy Document for particle Physics states

*‘Studies of the scientific case for future neutrino facilities and the R&D into associated technologies are required to be in a position to define the optimal neutrino programme based on the information available in around 2012; Council will play an active role in promoting a coordinated European participation in a global neutrino programme.’*

but whilst a substantial number of European physicists are involved with neutrino related activities a coherent approach for the longer term has yet to be achieved.

### ***To examine those techniques which potentially can substantially improve precision over that expected from current and future experiments in construction.***

The experiments which will dominate neutrino physics until circa 2015 are either under construction or about to start taking data. However a number of techniques for both accelerator and non-accelerator experiments have been proposed which will enable greatly improved accuracy for the measurable parameters. These experiments could start in the latter half of the next decade or early in the 2020’s.

### ***To stress the substantial technical problems associated with each technique***

The viability of some aspects of these future procedures is not fully established and so it will be a major task of the workshop to highlight those areas where major challenges remain. Many of these are substantial and will require the development of technologies of a size and complexity not previously encountered in the neutrino area. For the accelerator experiments this includes both the accelerator and detector developments necessary to achieve the goals.

### ***To devise plans for the European contribution to the R&D necessary to enable decisions to be taken around 2012 – 2013.***

For precision neutrino experiments to commence data taking around 2020 decisions need to be made by ~2013 in keeping with the aims of the European Strategy. An energetic programme incorporating design, R&D and costings is therefore necessary. Neutrino experiments at this level will necessarily be international but it is vital that the European neutrino community has a major impact on the debate for future facilities both within Europe and outside. An important aspect of the workshop is to highlight the areas where R&D is required and evaluate to what extent these are covered by current programmes either within the present European frameworks or on a broader international level.

### ***To consider the role of CERN in future international neutrino activities***

Neutrino physics at CERN has a long and positive history yet today, apart from producing the CNGS beam for the OPERA experiment, there is little activity in the experimental or phenomenological physics areas, the accelerator developments required for the next phase of experiments or the detector technologies needed to fully exploit them.

CERN has unique expertise and if Europe is to be a major player in this area in the future it would seem essential that CERN re-establishes a viable neutrino activity to participate in a wider European programme. This should be independent of whether future facilities are at CERN, elsewhere in Europe or the rest of the world. Speakers at the workshop will be asked to draw attention to those areas where they consider CERN participation would be most effective.

### ***To bring to light synergies between the neutrino area and other areas of physics***

As experiments become larger and more costly there are obvious merits if the experiments and the technical developments they require have wider application. Obvious examples are the needs of cosmology, theories relating neutrino properties to charged lepton flavour violation, the simultaneous use of large detectors for nucleon decay and the production of intense muon beams which may also be used for lepton flavour violation and a future muon collider. Such synergies will need to be taken into consideration when decisions over future directions are taken.

### ***To suggest a procedure for future coordination and development of European activities in the Neutrino area***

As an integrated part of the implementation of the European strategy for Particle Physics it will be necessary to establish an organisation and follow-up structures for the key R&D areas. This requires coordination with the Strategy Secretariat of the European Session of Council and appropriate means to achieve this will be discussed.