0.1 Neutrino Factories

Neutrino oscillations have been observed at several experiments over the last years. As a consequence there has been growing enthusiasm in the science community over the prospect of constructing a muon storage ring which would produce a unprecedented flux of neutrinos, i.e. the name: *neutrino factory*. This machine would aim a high luminosity neutrino beam onto a underground detector which would for example allow to search for CP violation in neutrinos.

The UK particle physics community is heavily involved in the research and development (R&D) for this new accelerator. The Rutherford Appleton Laboratory (RAL) has been mentioned as a possible site. The research council (PPARC) chairman has therefore set up a committee which should review the neutrino factory project. In particular he is asking this committee to address the following issues:

- What is the physics rationale for a neutrino factory? What are the scientific advantages of a neutrino factory compared to other sources of neutrinos such as the sun, cosmics rays (atmosphere) or existing accelerators?
- How does a neutrino factory work? What are the main requirements for a muon storage ring such that a 10^{21} μ-decays per annum will be produced? Describe possible designs and illustrate the R&D work that is still necessary before such a machine can be built?
- Establish a set of criteria for how to decide where a neutrino factory should be built. Where is the best site? How could UK science best profit from a neutrino factory project?

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