

London Postgraduate HEP Course 2016-17

Question

OPERA was designed to search for oscillations of muon neutrinos to tau neutrinos. A recent paper from the OPERA collaboration (N. Agafonova et al. *Phys. Rev. Lett.* **115**, (2015) 121802) describes the discovery of tau neutrino appearance in the CNGS Neutrino Beam. Explain, with reference to other papers as appropriate, how such an event was detected in OPERA and how relevant backgrounds were minimised by careful detector design and operation. Do not concentrate on the fundamental particle physics, beyond making clear the critical parameters of the particles to be identified, interesting though it is.

Submission Procedure

Your answers should not occupy more than 10 (ten) sides of A4 paper. You must acknowledge all pictures used and give full references. Please submit your answers to me by electronic mail using the PDF document format (please check before submission that it can be opened in the current version of Acrobat Reader) Your assignment must reach me on or before **Monday 15 January 2017**. Please ensure that in the email *subject line* you commence with **London PG Course Detectors** otherwise I might delete it as spam. For the same reason please do not include any punctuation marks in the subject line or our mail filter may reject it!

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