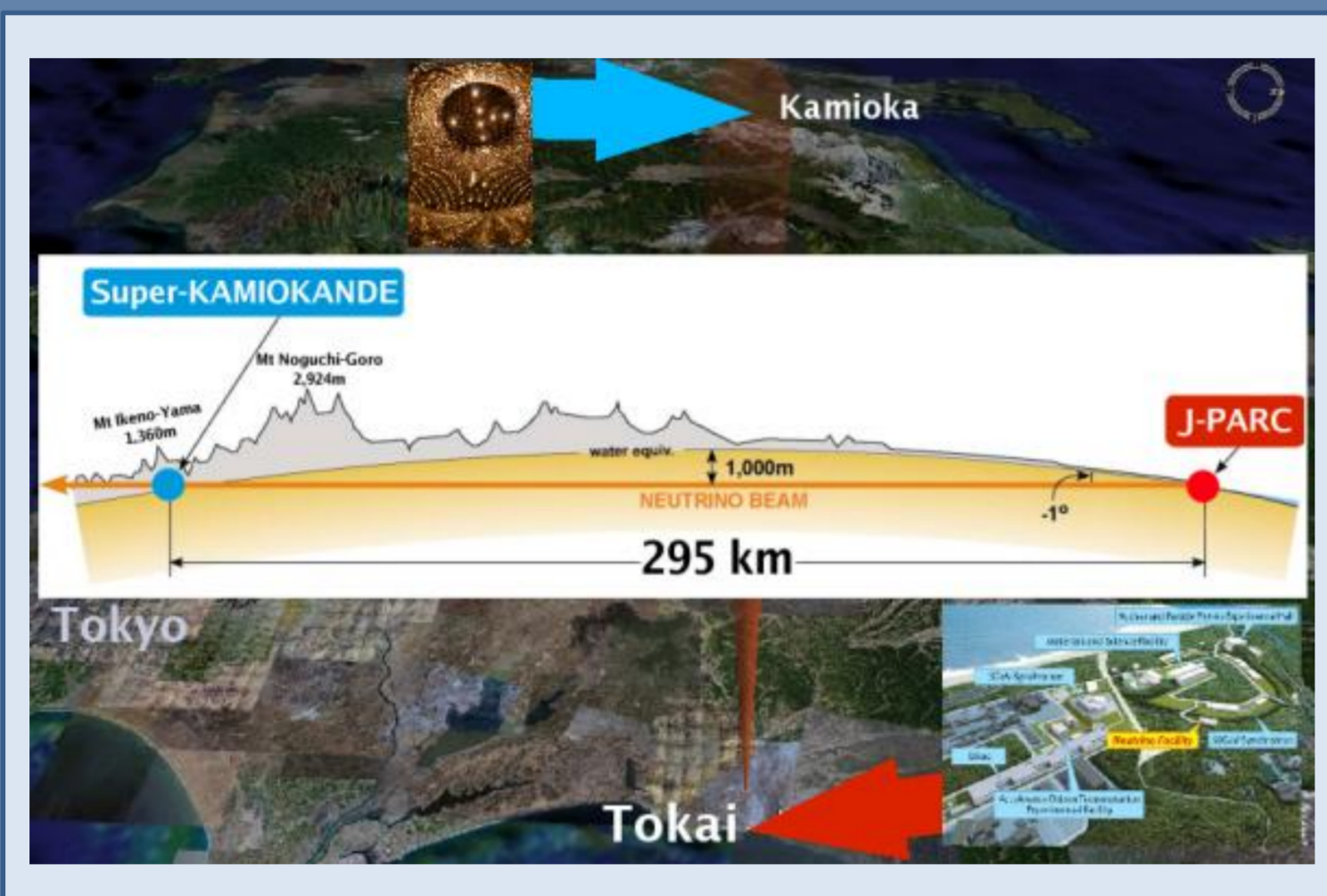
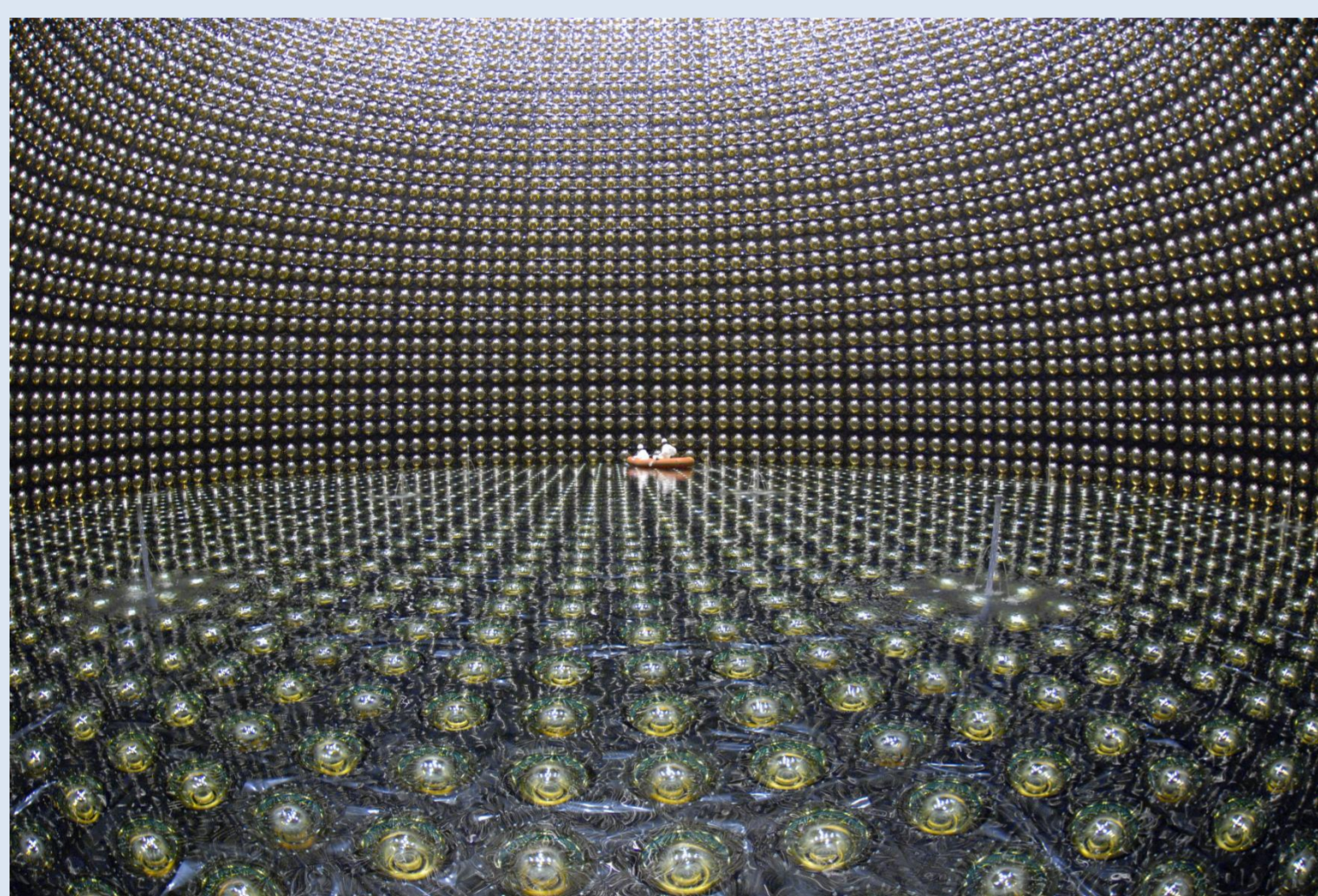


# Neutrino oscillations in the T2K

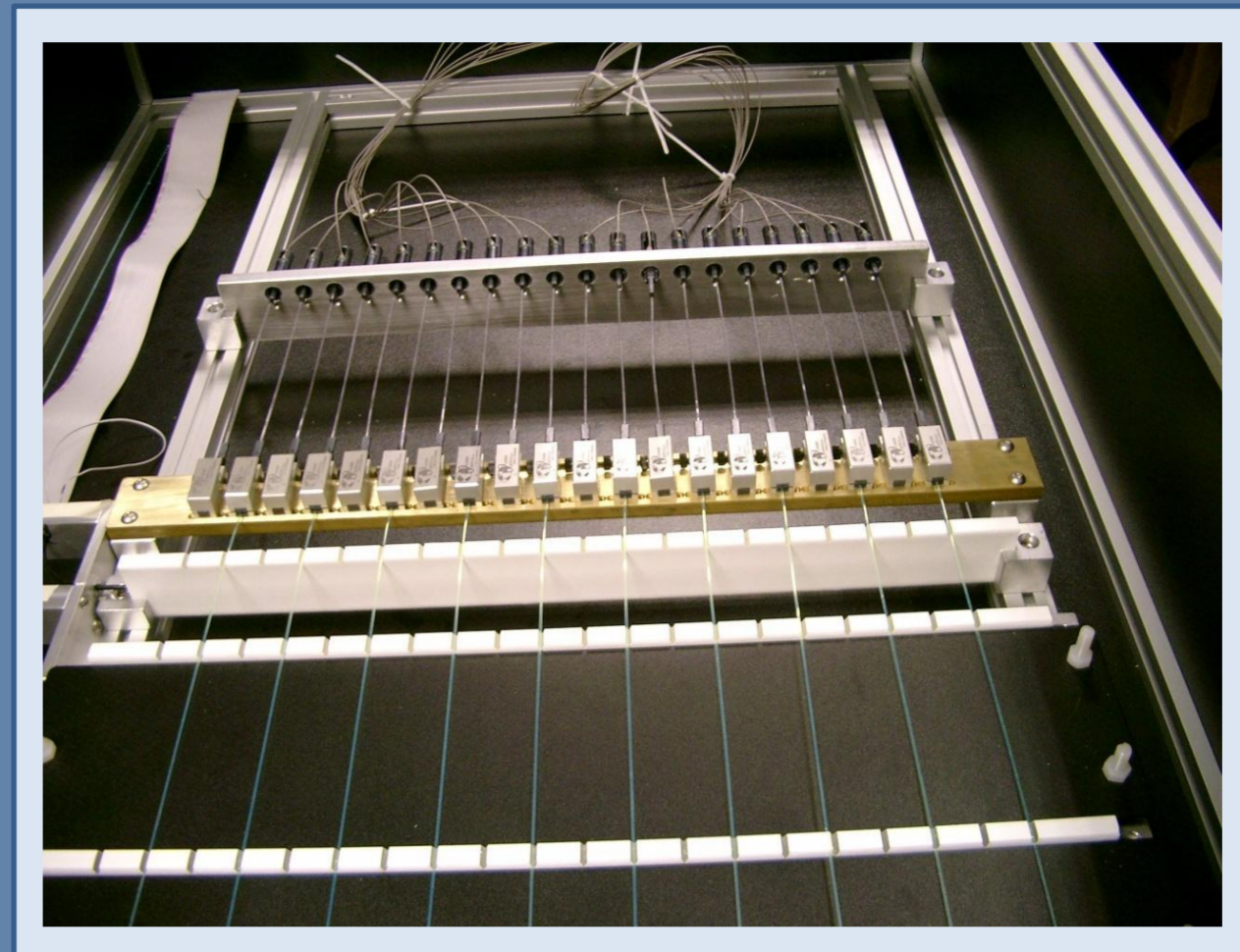
T2K is an international neutrino oscillation experiment which is based in Tokai, Japan. Its main aim is to measure the mixing angle  $\Theta_{13}$ .



In the T2K experiment a beam of muon neutrinos (with known flux) is created at J-PARC in Tokai (above). This beam is then fired over 295 km to Kamioka where the number of muon and electron neutrinos are measured in the Super-Kamiokande detector (below) utilising the Cerenkov effect.



$\Theta_{13}$  is measured by observing the number of electron neutrinos which have appeared due to oscillations from the beam of muon neutrinos. This is an important measurement as a non zero value allows CP violation in neutrino oscillations. Furthermore it will help find the mass splitting between neutrino mass states.



## Project Summary

During the course of the eight week summer project, working with the elementary particle physics group on T2K; I have undertaken various tasks including:

- Measuring reflectivity of fibres
- Calculating attenuation length of fibres used in the detector.
- Running data comparisons between cosmic muon test beam data and physics simulations (see below)
- Investigating the temperature dependence on photodetector outputs
- Observing the variation in output within the bars

“A worthwhile experience, lending insight into the world of physics research at an international level.”

