My Project So Far

23/07/25

Callum Oozeerally

My Progress

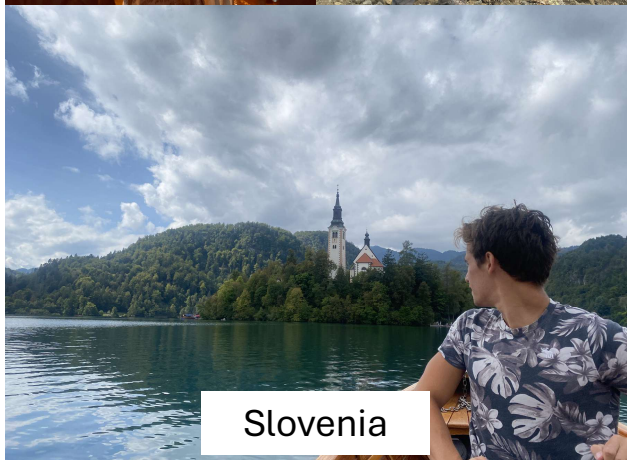
Who am I?

- Love to travel
- Love to be active
- Love Physics

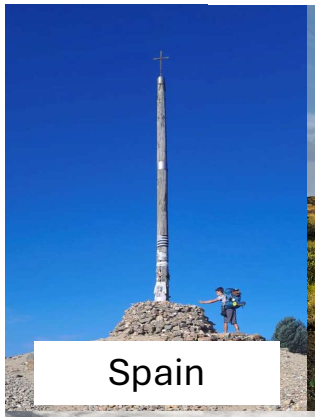
2023


Morocco

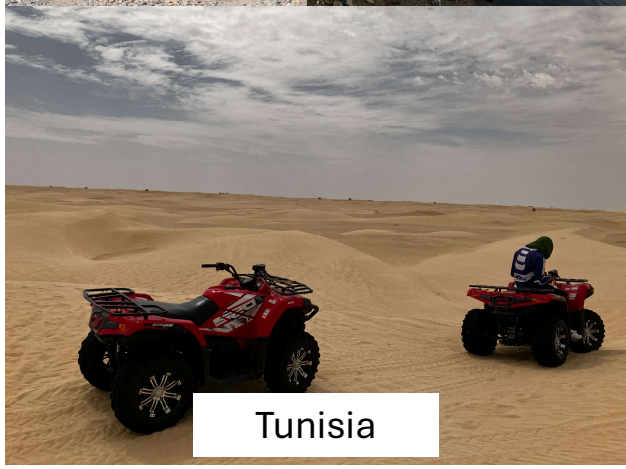

Iceland


Slovenia

2024

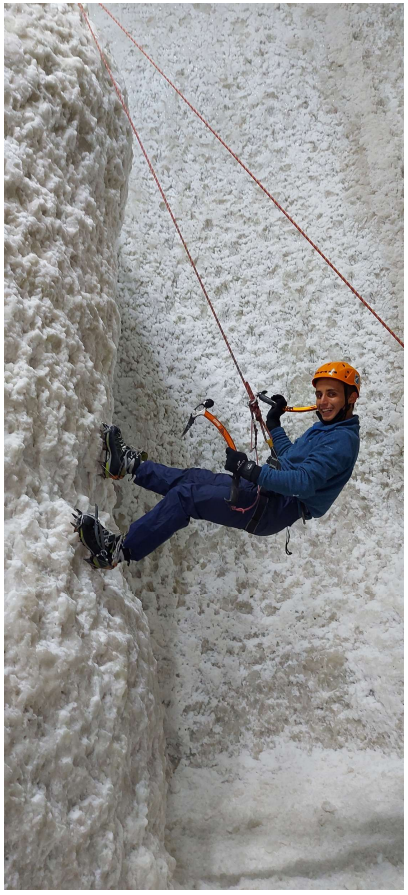

Spain


Scotland


Tunisia

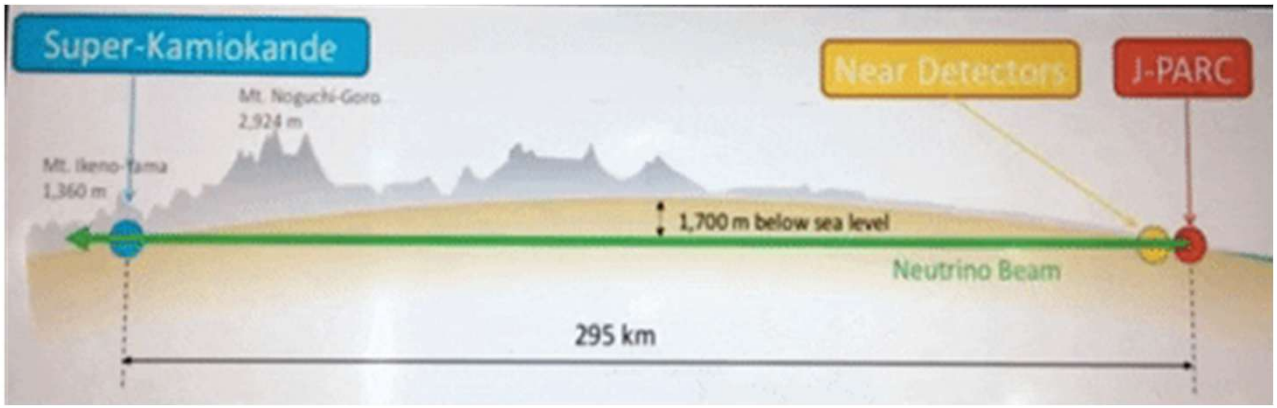
Who am I?

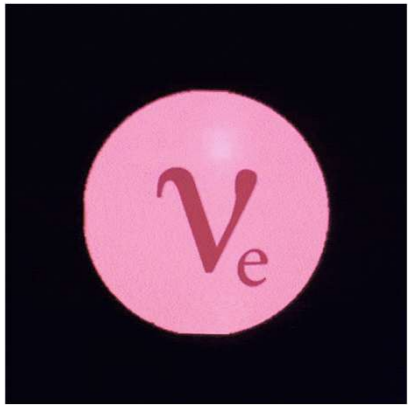
- Love to travel
- Love to be active
- Love Physics



Who am I?

- Love to travel
- Love to be active
- Love Physics





Where I study – Durham University

Filming for Harry Potter

Why am I starting now?

I've been working at the Wimbledon Tennis Championships:

- Making tens of thousand of Pimm's Pints

- Meeting lots of famous people

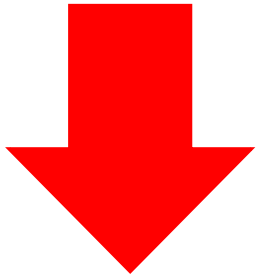
Plans for the Project

Exploring the effectiveness of different scintillators

A “Good” Scintillator

- High density and atomic number
- High light output with spectra matched to the sensitivity of the detector
- Effective decay time of the light pulse
- Little radiation damage over time
- Is appropriate at the required operation temperature

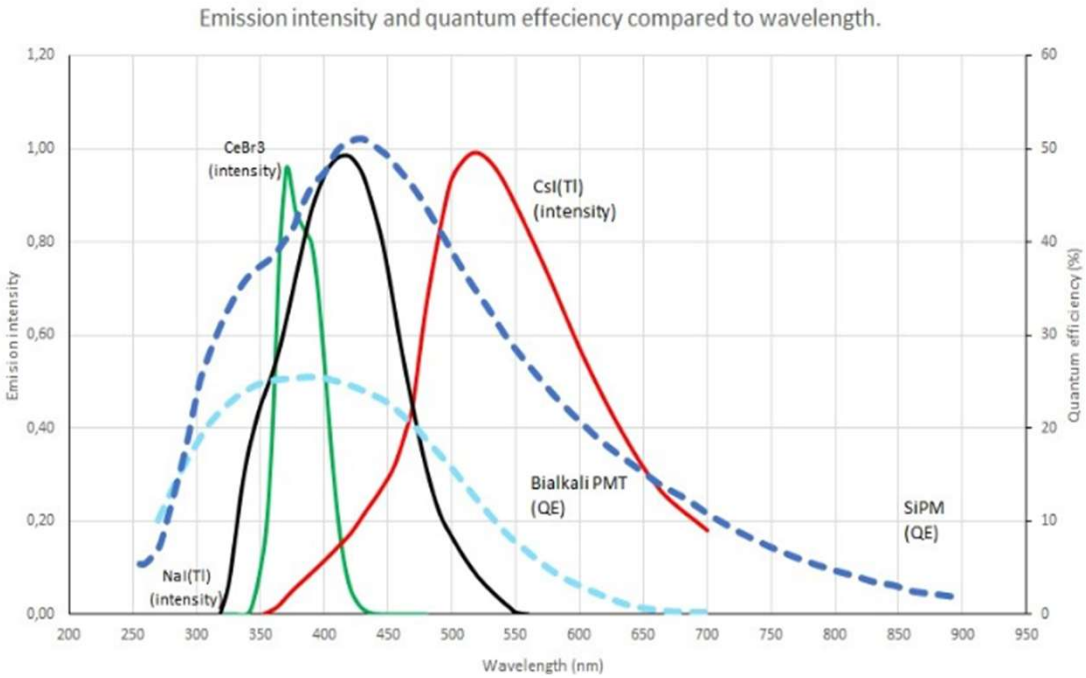
High density/atomic number



More Interactions

A “Good” Scintillator

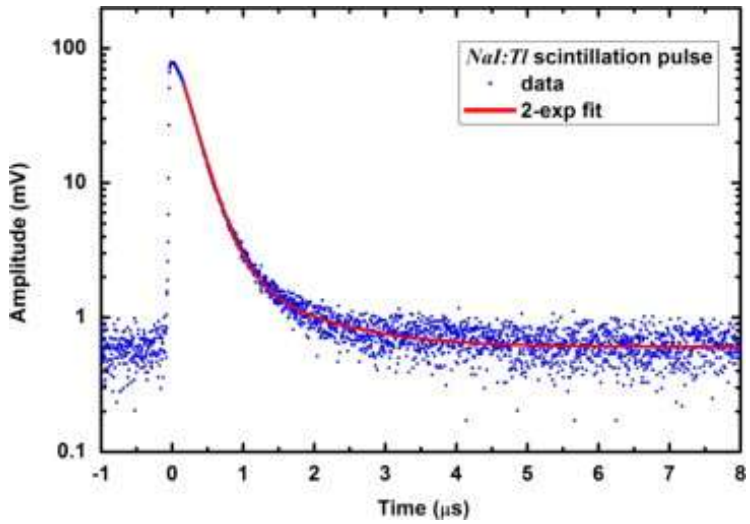
- High density and atomic number
- High light output with spectra matched to the sensitivity of the detector
- Effective decay time of the light pulse
- Little radiation damage over time
- Is appropriate at the required operation temperature



Solid lines show the emission spectra of NaI(Tl), CsI(Tl) and CeBr3, scaled on maximum emission intensity.
Dotted lines show the typical quantum efficiency (QE) curves of a bialkali photocathode and a Silicon Photomultiplier (SiPm).
(Sourced from: Scintillation Crystals ⋆ Scionix)

A “Good” Scintillator

- High density and atomic number
- High light output with spectra matched to the sensitivity of the detector
- Short effective decay time of the light pulse
- Little radiation damage over time
- Is appropriate at the required operation temperature

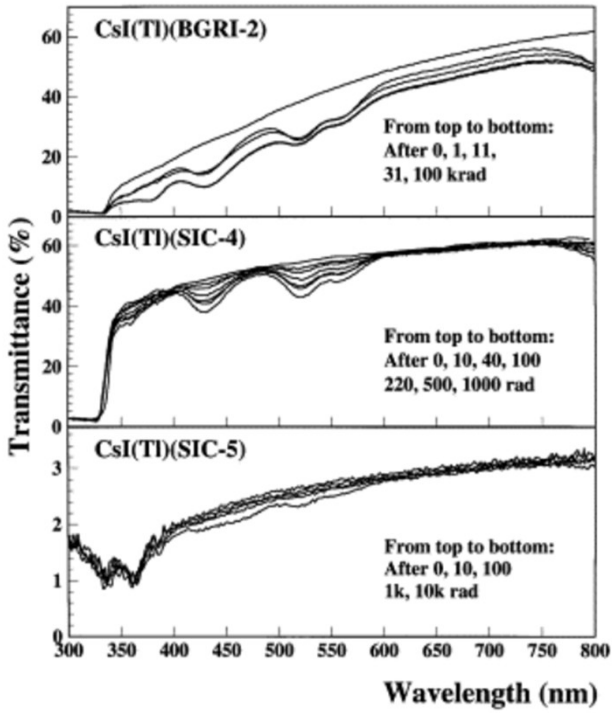


Averaged scintillation pulse recorded for NaI:Tl irradiated with a ^{137}Cs source. Two exponential terms fit to the data is presented with solid line.

(Measuring the scintillation decay time for different energy depositions in NaI:Tl, LSO:Ce and CeBr3 scintillators, Swiderski, L. et al., 2014)

A “Good” Scintillator

- High density and atomic number
- High light output with spectra matched to the sensitivity of the detector
- Effective decay time of the light pulse
- Little radiation damage over time
- Is appropriate at the required operation temperature

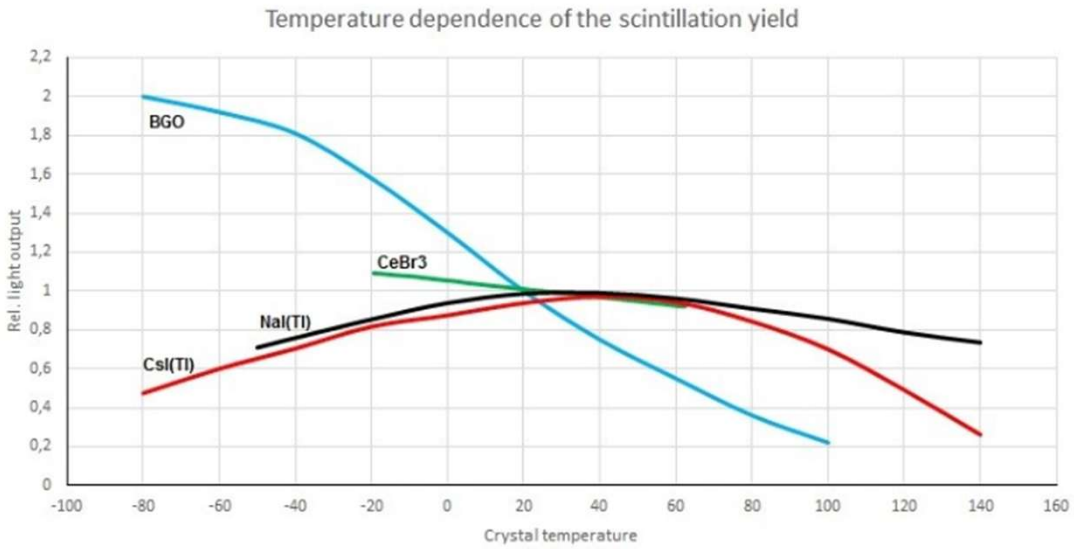


Longitudinal transmittance of CsI(Tl) samples, showing radiation-induced absorption bands.

(Radiation damage in scintillating crystals, Ren-yuan Zhu, 1998)

A “Good” Scintillator

- High density and atomic number
- High light output with spectra matched to the sensitivity of the detector
- Effective decay time of the light pulse
- Little radiation damage over time
- Is appropriate at the required operation temperature



Temperature dependence of the scintillation yield of NaI(Tl), CsI(Tl), BGO and CeBr3.
(Sourced from: Scintillation Crystals ⋆ Scionix)

Plans for use

μ

e

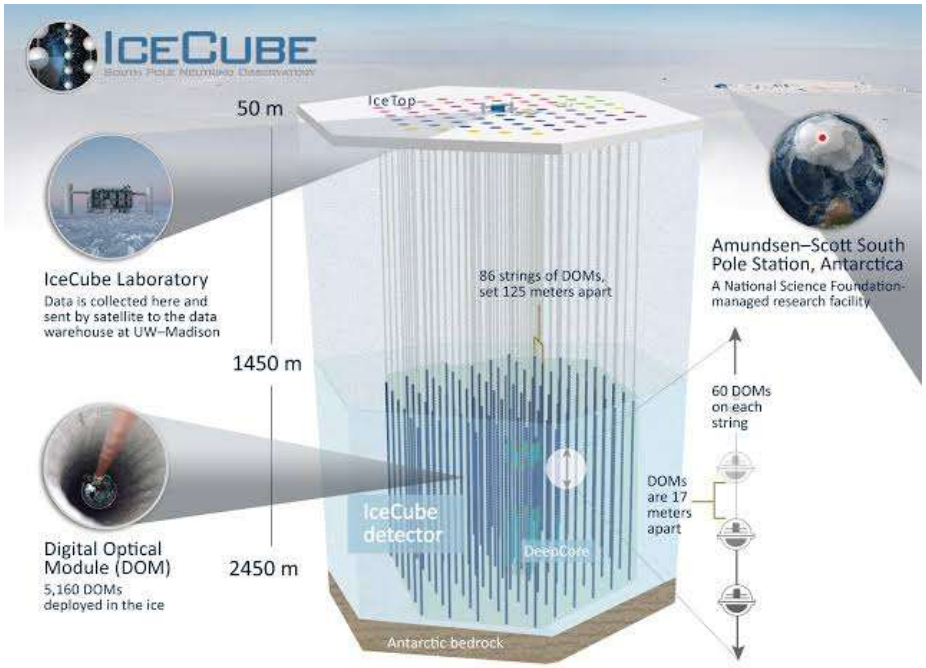
Flavour conservation is violated by quark mixing and neutrino mixing.

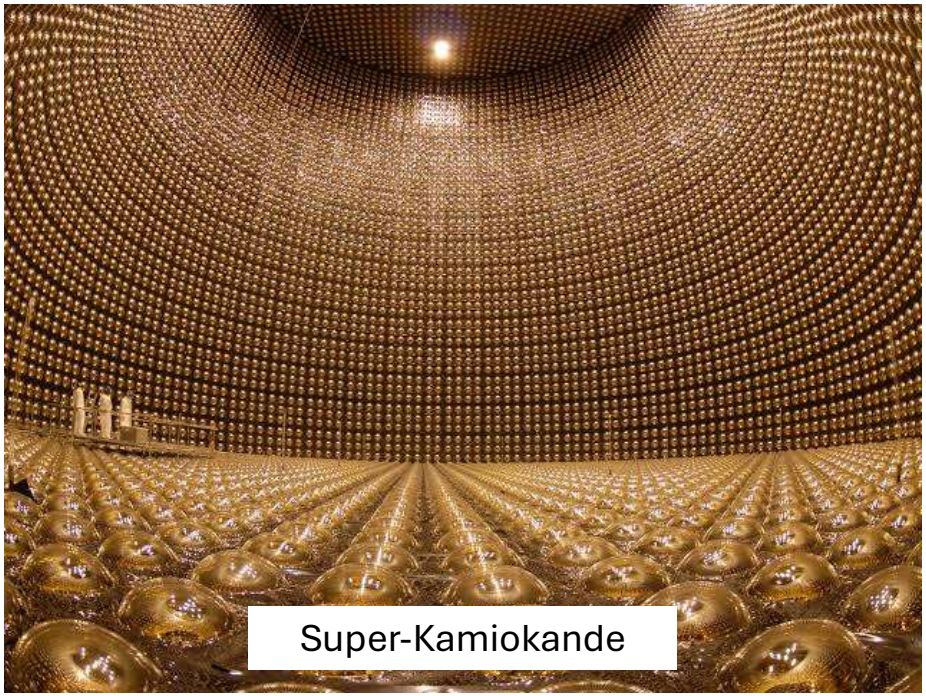
Both have been observed

Why has violation not been seen for charged leptons.

Thank you for listening

Hopefully my future in Physics:




Super-Kamiokande

Japan so far

Japan so far

Tokyo


歌舞伎町一番街


Tochigi
Gunma
Ibaraki
Saitama
Chiba
Tokyo
Kanagawa

Kamakura

Hakone

Tokai