

# Statement of Intent

**Name:** Daragh Hollman

**Experiment:** Muon Detector

**Date:** September 12, 2023

## **1 What is the aim of the experiment?**

The aim of this experiment is to measure the half-life of the muon.

## **2 What measurements will be made and how?**

A photo-multiplier (PM) tube will measure the light from the scintillator and convert it to an electrical signal. This is passed to the Time-to-Amplitude converter which creates an output pulse of some specified time length, with amplitude linearly proportional to the signal length from the PM. These pulses are read by a multi-channel analyzer which records them as data points in counts against channel number (time).

## **3 How will the final result be obtained from the experimental data?**

These data will be plotted on a semi-log plot and a calculation of the background counts will be made by taking an average of the tail end of these (i.e. upper channel numbers where the curve flattens). This background will then be subtracted from all points and plotted again fitting a straight line using least squares methods. The slope of this fit represents the half-life.

## **4 What are the main safety concerns with the experiment and precautions that should be taken?**

We are working with high voltage electronics, and thus care must be taken to ensure there are no risks when handling the apparatus.