

The initial test for fluorescent tube detector at Helwan lab

Dr.Ayman Mohamed Mahrous

Helwan University

Faculty of Science

ENHEP Helwan Group

Introduction

During the last summer training held for undergraduate students one of the students suggested to implement the idea of making a detector using fluorescent tube which seemed to be very interesting.

So we decided to make this simple detector and compare the results with that coming from the scintillation detectors that we already have, also working on improving this simple detector.

Tools used:

1. Fluorescent tubes.
2. Capacitors.
3. Ohmic resistance.
4. Some wires
5. Electronic modules (amplifier, discriminator, coincidence unit).
6. Two scintillation detectors.
7. An oscilloscope.

Starting the experiment:

We used the tools above in constructing the simple detector then applied high voltage (figure.1) to it and connected them to the electronic modules as follows:

- a. The output from the detector to the input of amplifier.
- b. The output of amplifier to the input of discriminator.
- c. The output of discriminator to the input of coincidence.
- d. After that we started to compare the signal coming from this detector with that coming from the scintillators and it was nearly the same!! (figure 2,3,4)



Figure.1 the simple detector constructed at Helwan Ps. Since we're using two tubes we've two out puts

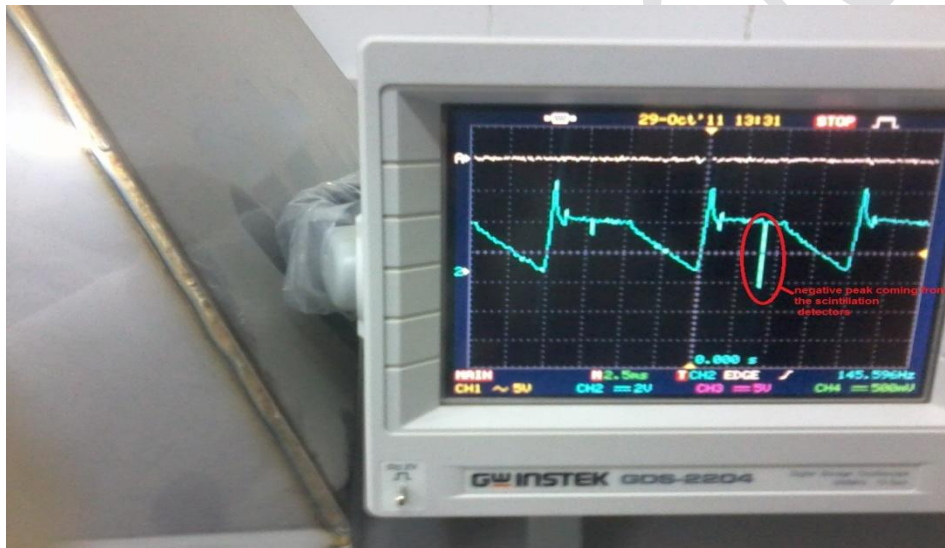


Figure.2 amplified signal from scintillation detector (the red mark refers to the negative peak)



Figure.3 the amplified signal coming from the simple detector (there's no negative peak and also as the red mark refers there's a cut in this signal)

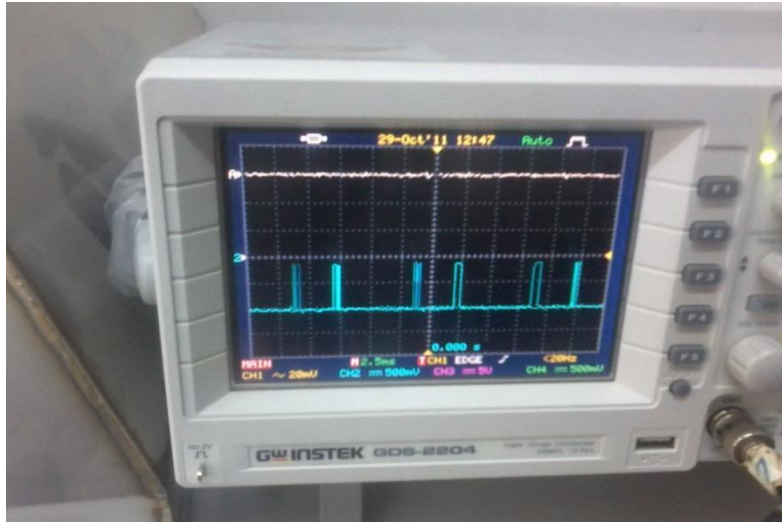


Figure.4 discriminated signal coming from the simple detector and very close to that coming from the scintillation detectors

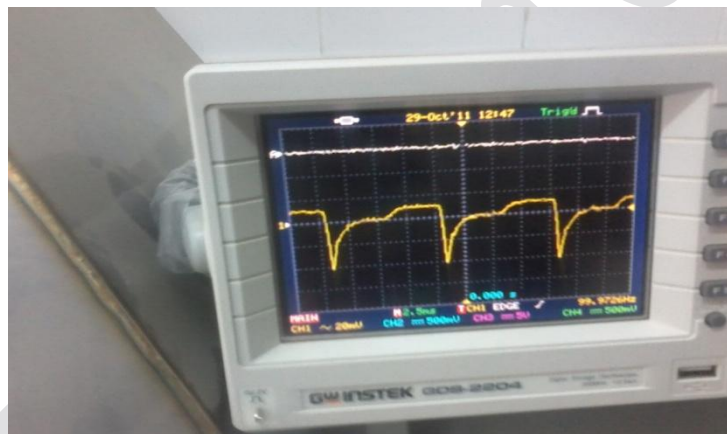


Figure.5 coincidence signal coming from the simple detector Which is also very close to that coming from the scintillation detectors

Later we thought about improving this detector step by step, first we used larger fluorescent tubes (figure.4) and to find out if it will make difference or not without any changes in the capacitor value or the resistance and also applied the same high volt (about 1kV) then start to get the signal and to compare it once again with that coming from the scintillation detectors.



Figure .6the fluorescent detector using larger fluorescent tubes

The following figures represents the results obtained from the simple :



Figure.7two amplified signals from the two outputs of the simple detector
(there seems to be a problem with one of the outputs)



Figure.8 two discriminated signals from the outputs of the simple detector



Figure.9 coincidence signal between the two output of the simple detector

What is next?

1. Working on finding out the problem of the output signals and hence the detector.
2. To see if we should improve some materials we used like the type of the copper we are using.
3. Can we apply higher voltage or not?and maybe use different value of capacitors .

Students involved:

Yassmin Emam: Yassmin is one of the active undergraduate students, it was her idea to construct this simple detector she brought most of the tools needed and worked on constructing and testing this detector under supervision of Shereen Farid Mohamed (Master student).

References:

http://hardhack.org.au/cosmic_ray_detector_2