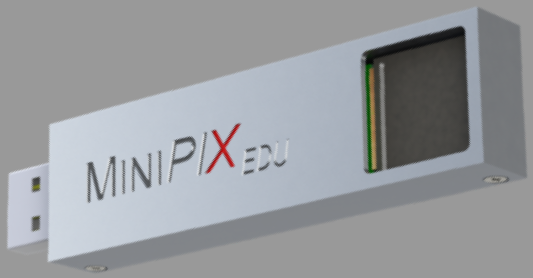
Queen Mary
University of London



Student's Reference Manual

Particle Physics
Research Centre
Outreach Team

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Introduction

MINI*PIX* EDU is a detector manufactured by ADVACAM[1] and designed as a USB camera to detect cosmic radiation for educational use. It is an initiative called the ADMIRA[2] project that aims to enable students at high schools to understand Particle Physics and experience the latest technology in cosmic radiation imaging. This technology was designed by the European Organization for Nuclear Research (CERN) and is used by astronauts at NASA to study radiation in space.

Sensor Material	Silicon (Si)
Sensor Thickness	300 µm / 500 µm
Sensitive Area	14 mm x 14 mm
Number of Pixels	256 x 256
Pixel Pitch	55 µm
Resolution	9lp/mm
Readout Speed	55 frames/s
Threshold Step Resolution	0.1 keV
Energy Resolution	0.8 keV (THL) and 2 keV (ToT)
Min Detectable Energy	5 keV for X-rays
Photon Counting Speed	Up to 3 x 10^6 photons/s/pixel
Readout Chip	Timepix
Pixel Mode of Operation	Counting, Time-over-Threshold, Time-of-Arrival
Connectivity	USB 2.0
USB Dimensions	89 mm x 21 mm x 10 mm (L x W x H) [1] https://advacam.com [2] ADMIRA: In Catalan, admira means admire, and it is the acronym of Activitats amb Detectors Medipix per Investigar la Radiació a l'Aula, which in English means Activities with Medipix Detectors to Investigate the Radiation in the classroom.
USB Weight	30 g

IMPORTANT INFO:

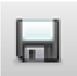
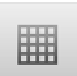
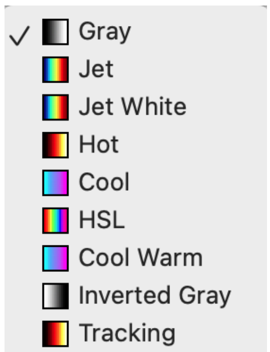
- **Do not touch or clean detector face under any circumstances**
- **Do not leave plugged in for more than 20 mins- this will cause it to overheat**
- **Do not expose to water or moisture.**
- **Do not expose to direct sunlight. If using outside, cover with an umbrella to give it shade.**
- **Do not let sensor have direct contact with any radiated rods.**
- **High humidity environments should also be avoided.**

Installation on a Windows Computer

1. Boot the computer and login with a username that has administration rights (you might need to ask the IT team to do this for you).
2. Insert the memory stick provided into one of the computer's USB slots.
3. Navigate to the "Configuration" directory and copy-paste the file inside to the Desktop of the computer.
4. To interface with the MiniPix device via the computer, the "Pixet" software must be downloaded and installed. To download, click on "Advacam Downloads.html" on the memory stick. This will open a web browser.
5. Under "**Pixet Pro 1.8.0 (Build 22b1f335) 22.02.2023"** (this is the software version), click "Windows 64 bit (setupX64.exe)". This may open a window prompting you for your name and email followed by another page where you must select the software again. Then, a file will be downloaded called "setupX64.exe" and saved to the "Downloads" folder on the computer.
6. Go to the Downloads folder and double click on the file that was just downloaded. Follow the install prompts from Windows to complete the install. When this is done, the "PIXet Pro", "PIXet Basic" or "PIXet" application should show in the start menu - you might need to search for it. Don't click on the application yet!!!
7. Plug in the MiniPix device - now click on the PIXet application described above from the start menu. This should open a GUI on screen.
8. Before the MiniPix device can be used, you must load the configuration file (this is the file that you copy-pasted on the desktop). To do this, you must enter "PRO" mode in the software. Do NOT do this at any other time - "Basic" should be used for all data taking. If in the top right of the GUI you see the word "PRO", click it. When prompted enter the password "showpixetpro". If "PRO" is not displayed, you are already in "PRO" mode.
9. Go to "File" in the top left of the GUI and click "Load config". This will open a file browser - navigate to the Desktop and select the file that you copy and pasted.
10. Next, go to "File" again and click "Reconnect".
11. Now switch to the "Basic" version of the software by going to "Tools" and clicking "Pixet Basic".
12. If you haven't already done so, remove the plastic mesh cover from over the sensitive area by sliding it off.
13. The right hand side of the GUI should now be used to configure the optimal settings for data taking. For first tries we suggest: "Image Properties - max" set to between 10 and 100, "Measurement - mode" set to "Tracking", "Measurement - exposure" set to between 0.1 s and 0.5 s and "Measurement - sum" ticked. We also suggest setting the color map to "Jet White" via the Pixet Toolbar.
14. Click "Measurement - Play". Happy data taking.

Pixet Toolbar

The main window can be seen in the previous page. Along the toolbar are a number of functional buttons. The table below describes each button in order from left the right.

Button	Name	Function
	Open Frame	Opens and loads measured data from hard disk into the software. The frames can also be opened by dragging and dropping frames on to the frame panel.
	Save Data…	Saves all the measured data (frames) from the memory to a hard drive. User can choose between several file formats to save the frames.
	Show Grid	Shows grid over the frame that highlights borders between pixels of the frame.
	Rotate clockwise	Rotates the frame clockwise by 90 degrees.
	Color map	In this dropdown box it is possible to select colours that are used to map values of the frame. The colour map options are shown:  We suggest using the 'Jet White' setting in order to get the best visibility of particles.
	Under warning	This button sets if the values under the selected range should be highlighted with a special colour.
	Over warning	This button sets if the values over the selected range should be highlighted with a special colour.

Menus

File

The File menu contains a repeat of the 'Open Frame' and 'Save Data…' Toolbar options. To save a picture of the detector screen, choose any of the three options and save as a .png file. This saves a high resolution image of the screen.

View

- Show Tab Bar: Repeats the information of the top bar just below itself.
- Mirror Image: Mirrors the display of the main window. When in the original rotational position, this is a left-right mirroring effect. If the display has been rotated it does the same mirroring but rotated. This means that if it is 90 degrees from the original orientation, it mirrors up-down. Rotated 180 degrees it becomes a left-right mirror again.
- Rotate Image: Gives the options of rotating 0, 90, 180, 270 degrees (clockwise).
- Ensure Aspect Ratio: Ensures the pixels are displaying correctly as squares when the window is resized and the display is zoomed in/out. This option is selected on start-up.

Main Window Panel

Image Properties

This panel of the main window allows the user to set maximum and minimum values for the colour map. These maximum and minimum values are a purely visual tool for the user and does not affect the tracks which are detected; only how they appear. Please read the 'optimal settings' section on the best way to view the particles.

Measurement

- Mode: This can be set the either Tracking or Imaging. The default on start-up is whatever the last user used in the previous session. Tracking mode allows for tracking different types of particles being detected. Imaging mode gives a binary value for whether a track is present.
- Frames: Sets how many images are taken by the detector in an acquisition run.
- Exposure [s]: Sets how long each frame taken is exposed for.
- Sum: Checking this box overlays the tracks from each frame on top of each other so all tracks from an acquisition run may be viewed at once.
- "▶Start" : this button begins the process of taking frames, taking each exposure after the other, with a live feed on the detector screen. A progress bar can be seen in the bottom right hand corner of the screen.

Image Info

This panel gives information, not settings, for the image shown on the screen. In Imaging mode, the panel consists of:

- [X,Y]: The live pixel coordinates over which the cursor is hovering.
- Count: The value of the pixel over which the cursor is hovering.
- Min: Smallest pixel value of the currently displayed frame.
- Max: Largest pixel value of the currently displayed frame.
- Pixel Count: Number of pixels with a value which is not zero of the currently

displayed frame.
- Total: Sum of all pixel values in the currently displayed frame, given in KeV.
- Mean: Mean of all pixel values in the currently displayed frame.

In Tracking mode, the same information is available in the panel but also adds a second Tracks tab. This tab counts alphas, electrons, muons, and dots in a list.

Main Window Extra Features/Information

- The user may zoom in to see small tracks by a click+hold of the left mouse button and making a rectangle of selection. A double left click returns to the maximum zoom out.
- If the display is zoomed in and the image is rotated, mirrored, or Ensure Aspect Ratio is selected from the View menu, the display returns to the maximum zoom out whilst carrying out whichever action was chosen.
- The specific frame of an acquisition run may be viewed using the slider below the display. Note: this slider must be slid across to the desired frame; it does not allow for simply clicking on the region along the slider's line.
- The time elapsed and number of frames completed in a run may be seen in the bottom right corner of the window. This is a convenient way to keep track of runs since they do not automatically end.
- The Messages button at the bottom of the window gives any error messages in the event of a crash or any other problem with the software or detector. On start-up the 'Open when new message' box is checked by default such that if there are any issues it will open and display the error message.

Optimal settings

For the following experiments, there are particular settings to select to allow for efficient and clear data to be taken. they are selected using the panels and settings described above. These include:

Pixet Pro	**Pixet Basic**
Colour map = "Jet white" Image properties -> - min=0, max= 20 Measurement -> - Type= Integral - Count= changeable for the experiment - Time[s]= 0.1 or 0.2 Detector settings -> - threshold[keV] = 5.0 - Bias[V}= 200 - Mode: Energy	Colour map = "Jet white" Image properties -> - min=0, max= 10 to 100 Measurement -> - Mode= "Tracking" - Exposure[s]=0.1-0.5 - Sum= ✓ Image info->

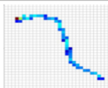
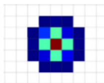
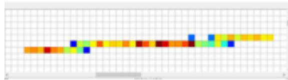
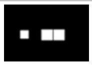
Theory

Cosmic Radiation

Every second, thousands of cosmic rays, mostly H_2 and He nuclei, strike every square metre of the earth's upper atmosphere. When cosmic rays crash into air molecules in the atmosphere, they create a shower of other fundamental particles: pions π, kaons k, positrons e^+, electrons e^-, neutrons n, neutrinos ν, gammas γ, X-rays, and muons μ. Scientists use particle detectors to detect the direction and energy of these particles and use them to study the original cosmic rays.

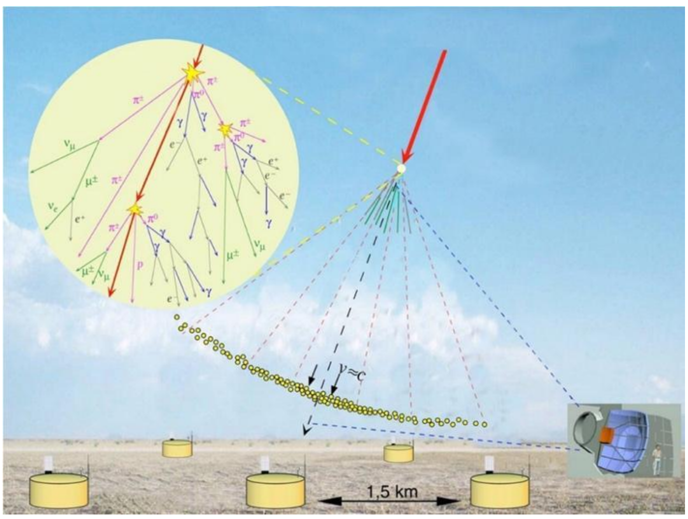
Students can see radioactivity visualised on their computer screen using MiniPIX EDU detectors. using these detectors, and the instruction in this manual, they can conduct a variety of radiation-detecting experiments.

Radiation patterns

Cosmic radiation types detected using MiniPIX EDU		
Radiation type	**Pattern created**	**Image on the screen**
Electrons (Beta particles β)	Substantial deviations due to the light mass of the electron.	
Alpha particles α	High-energy blobs, lead to great transient currents in pixels.	
Muons μ	Long line tracks due to the high kinetic energy of the muons.	
Dots (Gamma rays γ)	Individual dots of varied energy.	

Radioactive decay

Caution! students should hold the radioactive course at the non-decaying end. Alpha-decay is stopped by a few centimetres of air, so holding the source-rod at the correct end poses no risk if handled correctly.



Most of the cosmic rays detected on the earth's surface are muons despite their short half-life. Muons have a 1.5 μs (1.5 millionths of a second) half-life before they spontaneously decay into an electron (e^-) or positron (e^+) and some neutrinos (ν). This means muons live for an average of around 2.2 μs long. These muons typically travel at around 99.995% of the speed of light (c). In terms of distance = speed * time, this would mean that we shouldn't be able to detect muons from the upper atmosphere here on the surface. They can travel from the upper atmosphere to the ground due to special relativity, which causes time dilation. Special relativity occurs when the speed is constant, but length and time can change when objects travel at close to the speed of light. These changes depend on the relative motion of the observer and the object (or on a difference in gravitational potential between their locations, but we don't have too many black holes in our atmosphere to worry about). From the muon's perspective, the earth and the atmosphere are moving at 0.99995c toward the muon.

The production of a cosmic ray shower by an energetic particle from far outside our Solar System.

The dilated time on earth Δt_{earth} can be calculated if the proper time of the muon Δt_{μ} and the speed v are known using the relationship:

$$\Delta t_{earth} = \Delta t_{\mu} - \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

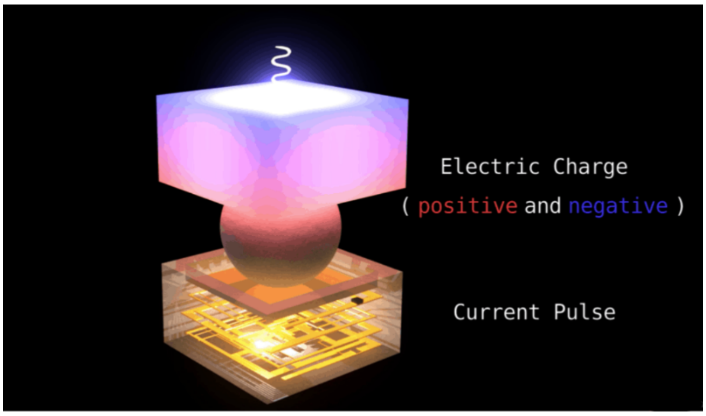
The length of movement is contracted by a factor depending on the speed.

$$L_{\mu} = L_{earth} \sqrt{1 - \frac{v^2}{c^2}}$$

All of this means that even though they should travel only 600m, with the help of special relativity they can make it all the way down to our detectors. Remember: the approximate flux is 1 muon per square centimetre per minute. The MINI*PIX* EDU system is just below 2 cm^2 so anything significantly higher than two muons per minute may suggest an issue with the detection ability of the device needing it to be recalibrated.

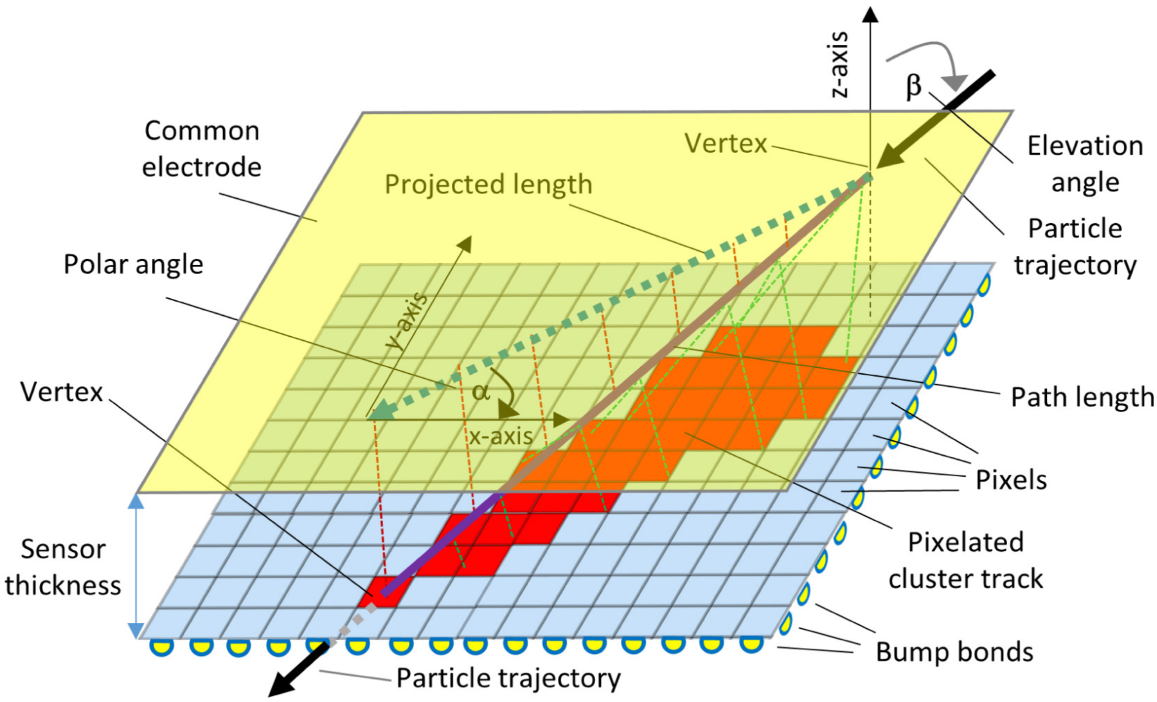
How the detector works

ADVACAM's imaging cameras are direct conversion single photon counting pixel detectors. The term direct conversion refers to the immediate conversion of radiation into electric charge within the semiconductor crystal. The term single photon counting means that every single particle of radiation detected in an individual pixel is processed and counted. This will eliminate all other sources of noise that are present in CCD or flat-panel-based cameras.



Direct conversion is where radiation is converted directly into electric charge.

The photon counting cameras can discriminate or even directly measure incoming photons' energy (wavelength). In MINI*PIX* EDU the energy deposited by every particle is measured by recording the number of clock cycles that the discriminator output is above the threshold level (this is usually called Time-Over-Threshold). Most secondary cosmic rays from an air shower will be coming from the upper atmosphere, heading directly downwards. If the detector is perpendicular to them, they will appear as single-pixel dots on the detector and will deposit a smaller portion of their energy. If the particles enter at a shallower angle, they will deposit more energy and give a longer trail.



Layers of the MiniPix $_{EDU}$ detector. The detector provides an array of 256 × 256 pixels (a total of 65536 independent channels)

Before starting any experiments with the MiniPIX $_{EDU}$ system, the black protective cap should be removed to uncover the silicon detector face.

EXPERIMENTS

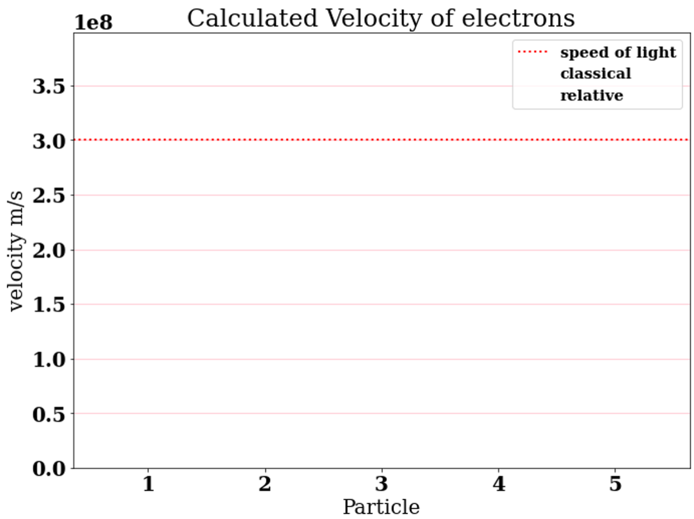
EXPERIMENT 1- examine the relationship between velocity and kinetic energy for beta particles

Before starting, please read the theory section in order to understand this experiment better.

1. Set up the minipix detector and run it until at least five electrons (beta particles) are visible on the detector screen. Start with 4000 frames and use the optimal settings from page 7.
2. Identify five electrons (beta decay) on the detector screen using the guide on Page 8. You may wish to use a radiation source to find faster electrons, but this is not a necessity.
3. Zoom in on each of these electrons on the detector screen so that all the pixels representing an individual electron are visible (like the images of the particles on page 8).
4. Under the 'Image Info' tab, take note of the value labelled 'total'. This is the kinetic energy of the electron in KeV (or kiloelectron volts).
5. Convert each electron's kinetic energy you just found from KeV to Joules by dividing the kinetic energy by 6.2415*10^15. Now your energy is in Joules.
6. Using the equation and values given below, sub in the values and the kinetic energy you found to get the speed v:

    a. Classical Kinetic Energy → v = sqrt(2 E(k)/m)
    b. Relativistic Kinetic Energy → v = c (sqrt(1 - (1/(1 + E(k)/E(0)))

    Where c is the speed of light in a vacuum (approximately 300,000,000m/s),
    E(k) is the kinetic energy that you found in J,
    E(0) is rest energy (8.187122247e-14 J),
    m is the mass of the electron (9.1093837 x 10^-31 kg).
7. Repeat this for all the electrons you found.
8. Plot the data for both the classical velocity and the relativistic velocity of a particle on the same bar graph. The graph should have 10 bars on it (if you used five electrons), with the classical and relative speed next to eachother for each particle. There is a template below.



- Look at the data to determine the differences between the two predictions.
- Is classical mechanics a good prediction for particles close to the speed of light?
- Extension- would you see a similar graph with alpha particles? Compare the graph of electrons from a radioactive source vs ones in the room, what is the difference?

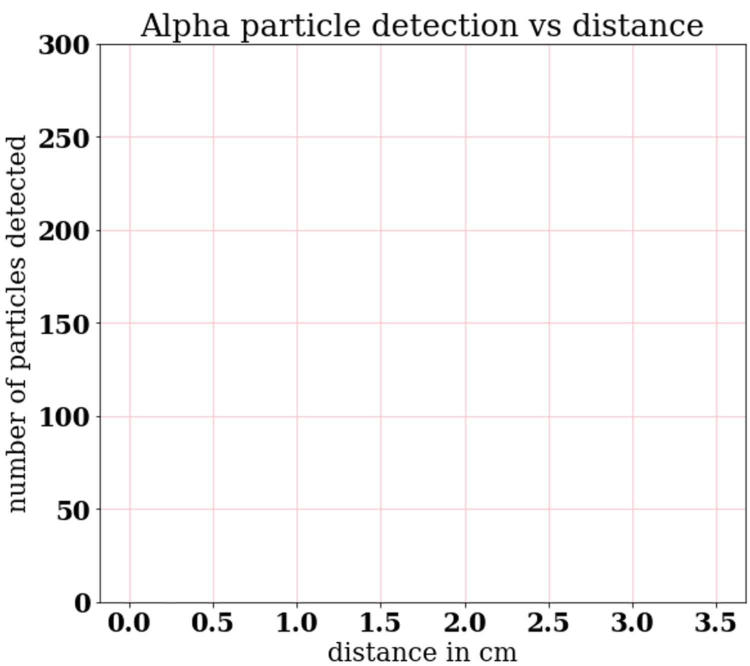
EXPERIMENT 2- Alpha radiation vs distance

You will need a radiation source for this experiment.

In this experiment, we will measure the amount of radiation emitted by a radioactive source at various distances from the detector. It focuses on alpha radiation, which is stopped by about 5cm of air. By setting up the detector with a radioactive alpha source and counting the number of alpha particles detected at different distances, we will explore the relationship between distance and the number of particles.

Consider what the best point is to take measurements from on the detector (e.g. will you line up each point at the end of the detector, or in the middle of the detector)? How will this affect your results? Think about where you would like to take your measurements from before you start.

1. Set up the radiation detector with the radioactive alpha source placed at 0cm from the detector screen.
2. Run the detector for 2000 frames and count the number of alpha particles that appear on the screen during this time.
3. Move the radioactive alpha source to a distance of 1cm from the detector screen.
4. Repeat step 2, running the detector for 2000 frames and counting the number of alpha particles.
5. Continue moving the radioactive alpha source away from the detector in 1cm intervals (or 0.5cm intervals if time permits) until a distance of 5cm is reached, repeating step 2 at each distance.
6. Record the distance from the source to the detector and the corresponding number of alpha particles detected in a data table.
7. Plot the collected data on a graph, with the distance on the x-axis and the number of alpha particles on the y-axis. An example of the graph axis is given.



- The graph displays the relationship between the distance from the radioactive source and the number of alpha particles detected. What is this relationship?

- What is the error on the distance?

- How can you work out the error on the alpha particles?

EXPERIMENT 3- Detecting muons at different elevations

Cosmic ray muons bombard the surface of the Earth every second. However, they can be scattered or absorbed by materials such as concrete. If you are using a detector inside a building, the concrete/building materials overhead could be lessening the amount of detectable incoming muons, by absorbing or scattering them. This can be investigated, by changing your elevation (height) in the building. Moreover, as the cosmic ray muons source can be thought of as a point very far from the earth, the inverse square law can be considered too. We can observe these effects.

Note: In order to complete this experiment, you must be able to change floors in your building. In order to attain a good comparison of muon counts, we advise a difference of 2 or 3 floors.

1. Set up your MiniPix detector facing upwards, on the lowest floor in your building, and record which floor you are on.
2. Take 4000 frames of data and record the total number of muons detected.
3. Go to the highest floor in the building, set up the detector in the same fashion and take the same number of repeats of 4000 frames, noting the number of muons detected.
4. compare the two totals, is there a difference?

Would you expect to see a difference at this small of a change in altitude? Why? why not?

EXPERIMENT 4- How much material is required to stop certain radiation

You will need a radiation source for this experiment.

Certain radiation can be stopped by different thicknesses of different materials. Lead can stop gamma radiation, a layer of clothing or a few millimetres of a substance such as aluminium can stop beta, and something as thin as a piece of paper can stop alpha radiation.

Using this information, compare the best materials you can find for stopping alpha particles from hitting the detector! I suggest starting with a very thin material, such as tissue, then building up the thickness to paper, then plastic, then metal.

1. Ensure a safe and controlled environment for the experiment.
2. Keep the radiation source at a distance of 0.5cm away from the detector.
3. Take 4000 frames of data with the radiation source at 1cm away.
4. Record the number of alpha particles detected on the detector.
5. Now test how well materials shield the alpha from the detector by placing different materials between the detector and the radiation source.
6. Take 4000 frames of data for each material that you use, and record the number of alpha particles detected. (Start with the thinnest material).
7. Compare this to the baseline test to see what thickness of material is needed to block alpha radiation.

EXTENSION- The same steps can be repeated for beta radiation (electrons).
Summarise the findings of the experiment and explain the most effective materials for stopping each type of radiation. Discuss any trends observed and potential applications of these materials in real-life scenarios.

Design a safety outfit for a scientist entering a radioactive room containing an alpha source. Why have you chosen this material?

What does this tell us about the importance of safety when dealing with radiation sources?

EXPERIMENT 5- Muon detection near/ far from the window

The aim of this experiment is to demonstrate the scattering and absorbing effect which building's concrete can have on cosmic ray muons. This experiment will be similar to Experiment 3, except instead of changing floor in a building, to detect more muons, we will be moving the detector horizontally closer to a window.

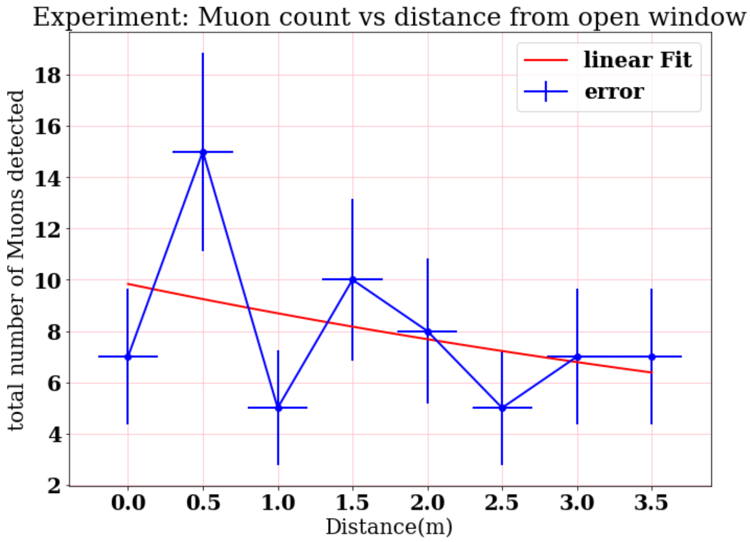
Before conducting this experiment, students should be familiar with the origin of cosmic ray muons, as described in the theory section.

1. Choose a large window in the classroom and close all blinds/curtains/shutters except for this one.
2. Use a meter ruler and measure 3 metres from the chosen window. This is your far distance.
3. At your far distance, set the detector down to start taking frames. We recommend 4000 frames, repeated twice or three times, depending on time constraints. set the threshold to 0.5keV, and the time for each frame as 0.1 seconds.
4. For each repeat, note the number of muons detected. Once you have performed 2 or 3 repeats, total up the number of muons you detected at this distance.
5. Now move to your close distance, this will be as close as you can get to your chosen window.
6. Repeat the same frames of data taking, the same amount of times as step 3, now at the "close" distance. Total up your muons detected at this distance.

- Now compare your total muons detected close to the window, and total muons detected far from the window. What do you notice? And why could this be?

BONUS:

- If you have time, using the metre rule, try to detect muons in incremental distances from "far" to 'close". Make sure to note each distance you're detecting at.
- You can then plot a scatter graph of Total Muons detected vs Distance (m). You should get a relationship similar to the one below:



- Can you find the equation to the line you have? What is the relationship of this data?

EXPERIMENT 6- Is it radioactive?

Everyday items contain small levels of radiation in them. Using the minipix detector, your aim is to test the levels of radiation in everyday objects.

1. Before starting the experiment, measure the background radiation in the classroom. This will provide a baseline reading of natural radiation present in the environment.

2. Place the MiniPIX detector in an open area away from any potential sources of radiation and record the background radiation level for about 5 minutes. Note down the reading.

3. Now, one by one, test the items provided (you may want to try items like bananas, lowsalt and nuts) for their radioactivity using the MiniPIX EDU detector.

4. Place the MiniPIX EDU detector about 0.5cm away from each item and record the particle count for each item for about 5 minutes. Make sure to keep the detector stable and at the same distance from each item during the measurements.

5. After recording the radiation levels for each item, note down the readings in a table format.
    - Compare the radiation levels of each item with the background radiation measurement. What do you see?

    - Discuss why some items may emit higher or lower levels of radiation than others.

EXPERIMENT 7 - Cosmic Angles

We want to investigate how many muons are detected when the detector is at different angles.

Materials:

Minipix detector
Protractor
Bluetac or adhesive putty
Table or flat surface

Procedure:

1. Place the detector flat on a table. Make sure the Pixet software is on and ready for data collection.

2. Before changing the angles, record the number of muons detected by the detector when it is flat on the table for 4000 frames. Use the optimal settings on page 7 to get the best results here.

3. Attach a small piece of Bluetac to the back of the detector.

4. Carefully position the detector at an angle of approximately 30 degrees. Ensure it is stable and won't fall. As shown below:

5. Allow the detector to record the number of muons for 4000 frames, keeping the setting the same as before.

6. Record the number of muons and the angle.

7. Repeat the above steps for angles of 60 degrees, 90 degrees, 120 degrees, 150 degrees, and 180 degrees.

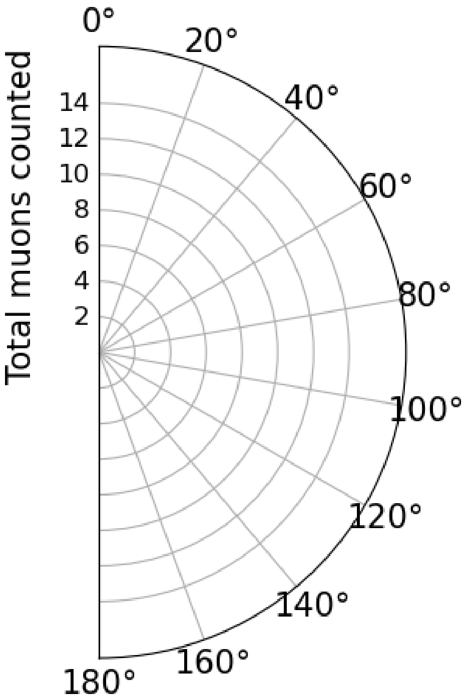
8. For each angle, record the number of muons detected.

9. Create a table to summarise the data, with columns for angle and radiation levels.

10. Plot a graph with the angle (x-axis) against the amount of muons (y-axis), we recommend a radar(spider) graph, as it can take a similar shape to the

protractor used in the measurement. Alternatively, you can plot a simple bar chart for each angle.

Angular rotation of the detector vs Total muon count



- What do you notice in the data, any relationships or abnormalities
- Is there any difference between the angles 0° and 180° ?
- What does the data tell you is the best angle to take data from? What is the worst?
- Explain why the maximum muon count is not at 0°.

Statistics

Statistics is very important in scientific research and experimentation.
A muon is likely to hit the detector around twice per minute. Taking a 3-minute reading is therefore most likely to give 6 muons, but it could also easily be 3, 4, 5, 7, 8, or 9 instead (or less, or more). The number of muons the experiment gets per minute can therefore vary from 1.0 to 3.0 (with the plausible numbers given) in this time frame. Instead of only 3 minutes, the margin of error can be significantly reduced by instead doing a 30-minute measurement. The more time spent measuring, the more data we have. The more data we have, the more confident we are in the results.

As mentioned before, keep periodically checking on the experiment to make sure the detector doesn't overheat. It is best to not take data readings of over 2000 frames, without unplugging and taking breaks between repeats, or you'll find the detector gets very hot, which can skew readings. Keep to a shorter exposure time of around 0.1s to ensure the best results. For a long experiment it should be the number of frames that gets increased. Very important: if results are being combined like in three 10-minute readings, make sure all the settings for each run are identical and the device conditions are still the same.

Troubleshooting

1) If the Laptop complains that the file cannot be downloaded as it cannot be checked by apple for malicious software - (mac 2018 version): search 'security & privacy' on macbook settings and manually allow Pixet to be downloaded under the section 'allowed apps downloaded from:' (it should appear as a check box)

2) For the same issue with Windows, enter the administrator username and password in the boxes prompted to solve this issue.

3) You can also find downloads for the Pixet software from this link if the memory stick version does not open https://downloads.advacam.com/auth.php. The steps for downloading it to your laptop are the same as before.

4) The MiniPix EDU device must be plugged into the PC before opening the Pixet software

5) Once you open the the software, you are greeted by a red message to add a configuration. By clicking "file -> load configuration" , you can select the appropriate configuration for your device from the memory sticks provided. You should choose the correctly designated filename, given by the configuration written on the case for the MiniPix EDU device. After loading the correct configuration, close Pixet and reopen, then plug in the detector, it should be fully working.

6) If the minipix is still not detecting, try loading in the correct configuration again by pressing the 'load configuration' setting from before. Shut down Pixet after loading, plug in the detector and open the software again to get the detector working.

7) If all else fails, close and reopen the pixet app.