EXERCISE Charge Collection

OBJETIVES:

To obtain the more probable charge of a MIP (electrons of 0,5MeV for ^{90}Sr) in a 300mm silicon sensor and to determinate the depletion voltage of the sensor.

https://colab.research.google.com/drive/1-SPUykrgu8FxlcBcMgmw8NvLDQat_0Ty#scrollTo=NFYTLngl5hmd

INITIAL STEPS:

1. Copy the notebook to your google Colab account (*File --> Save a Copy in Drive*)
2. Go to your drive and open the copied file, located in your *Colab Notebooks* folder

THE ANALYSIS PROGRAM:

Prepare the working environment

- Mount your driver
  You should enter your authorization code from the URL showed

  ```
  from google.colab import drive
  drive.mount('/content/gdrive',force_remount=True)

  Go to this URL in a browser: https://accounts.google.com/o/oauth?

  Enter your authorization code:
  ```

- Create directory "EASY-ChargeCollection" in your google drive unit
- Copy the data from the drobox

Import the libraries

Define Fitting functions (Landau and Gaussian)

Define Class GTimer (to print number of events processed every second)

Define Class to process the event

For each event
- <u>read</u>:   event number, Raw Data (ADCs), channel number, pedestal and noise
- return: Signal (AGCs). Signa/noise and Common Noise

```
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│                        Option                           │
│   •  Crate Data List with all the available run files   │
│   •  Define options to process the data and to plot     │
│      results                                            │
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│              Main Loop to process the data              │
│   For each event:                                      │
│   •  Read data and get Signal (ADCs), Signa/noise and   │
│      Common Noise                                       │
│   •  Define clusters                                    │
│   •  Get the energy of the cluster                      │
│   •  Convert Energy in ADCs to eV                       │
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│                   Some relevant plots                   │
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EXERCISE:

- Process: **Diodo-lat129-130V.h5**
    o Study different S/N cut cuts: 2, 3, 6,8
       (You need to run Options+Main Loop+Plots)

- Move area to fit the charge collection
  (You need to run only Options +Plots)

- **Process the runs with different Bias Voltage and plot Charge vs Voltage**
    o You need to run Options+Main Loop+Plots
    o Check that S/N is correct for each run (if you need to change S/N run Options+Main Loop+Plots)
    o Change the fitting area to get the best valuer of the peak, run only Options+ Plots