

2022 SPS beam test: prototypes displacement

- Main purpose of this test with Firenze prototype: measure the non-linearity of the light yield of LYSO by profit of the different ionization densities due to different nuclei charges.
- The impact of non-linearity of the light yield on typical space calorimeter and the “nuclei technique” is discussed here: “O. Adriani et al 2022 JINST 17 P08014”.
- Position of the two small CALO prototypes:
 - We agree about Ming Xu proposal: the IHEP prototype will be on-front of Firenze prototype for the first days, then during the primary ion run we will switch the position, so Firenze prototype will be placed in-front of the IHEP one.
 - We can switch again during the HERD test, by placing the IHEP prototype in front of the Firenze one, if it is needed.

Survival probability after 9 cm of LYSO: $\sim 66\%$ for proton, 12 % for Carbon, $<1\%$ for Argon.

$$\lambda_{LYSO}^p = 22 \text{ cm}$$

$$\lambda_{LYSO}^A = \frac{22}{A^{2/3}} \text{ cm}$$

$$\frac{N}{N_0} = e^{-x/\lambda}$$

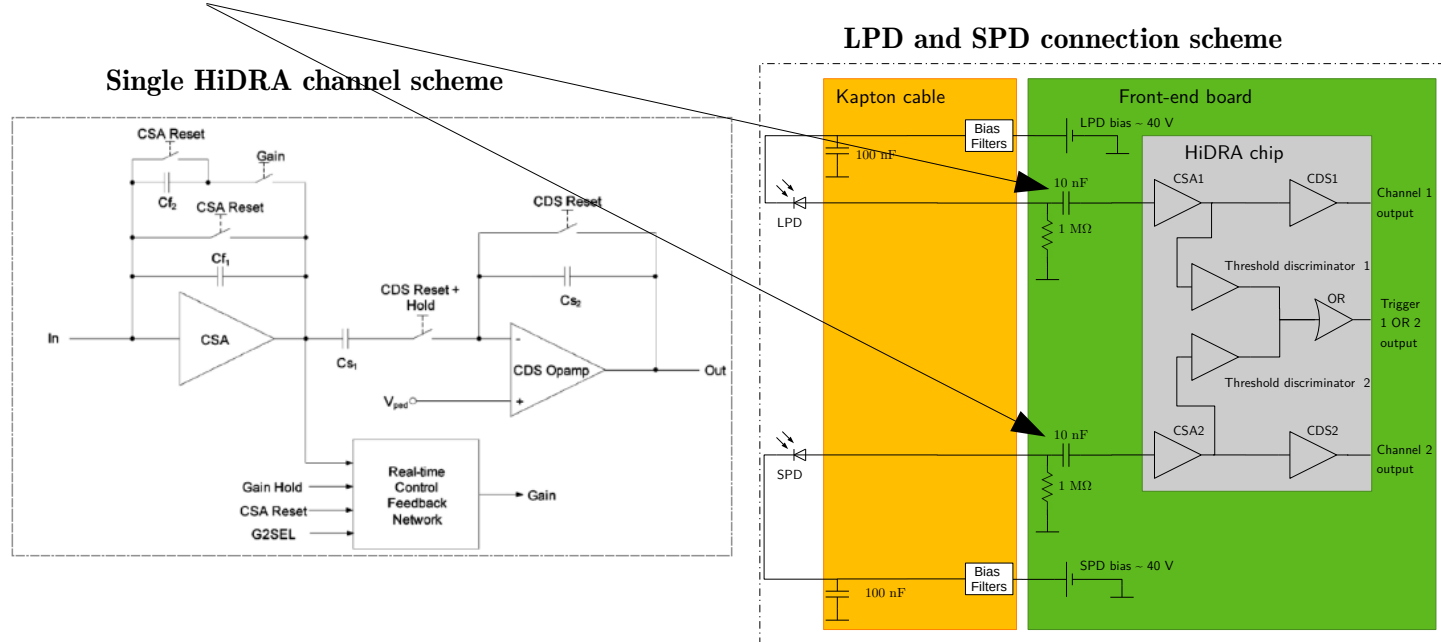
$$\frac{N^p}{N_0^p} = e^{-9/22} = 0.66$$

$$\lambda_{LYSO}^C = 4.2 \text{ cm}$$
$$\frac{N^C}{N_0^C} = e^{-9/4.2} = 0.12$$

$$\lambda_{LYSO}^{Ar} = 1.9 \text{ cm}$$
$$\frac{N^{Ar}}{N_0^{Ar}} = e^{-9/1.9} = 0.01$$

2022 SPS beam test: calibration trigger for PD

- At high rate (~ 1 kHz) and high input signal, PD system is affected by a base-line shift due to discharge of input capacitor of the CSA



- During the beam test we will acquire nuclei with different value of input time constant (R,C) ~ 10 ms.
- To properly measure the base line shift of the system we would need both IN-spill and OFF-spill calibration triggers (through I2C).
- We suggest to provide a 10 Hz calibration trigger, both IN-spill and OFF-spill if it is possible.

2023 SPS beam test schedule

- This is the schedule provided by Xingzhu:
 1. September 1st, the beam test model with ~1000 cubes arrived at CERN.
 2. August 15th , the beam test model is ready to ship
 3. July 15th~August 15th, the assemble test of CALO with the Intensified scientific Cameras
 4. May 15th ~July 15th, the assemble and test of CALO Array (layer by layer and 7*7*21 as a whole).
 5. May 1st ~May 15th , the assemble of LYSO +PD + WLSF, PD performance test
 6. April 1st ~May 1st, the gluing procedure of PD was defined and the ~1000 PD shipped to IHEP.
 7. December 15th,2022 ~ January 15th,2023, several PDs in the ~100 pcs ship to IHEP to determine the effect on the light collection on WLSF.
- Dead-line for PD system delivery to IHEP:

Few PD pcs to IHEP: **December 2022.**

~1000 PD pcs to IHEP: **April 2023.**

Kapton cables to IHEP: **June 1th.**

Electronic boards to IHEP: **July 1th.**