

Test Beam preparation

FCC-NA, 09/01/2024

Other test beam

- Calvision has already asked for and received a slot at DESY the week of April 22-29, to which we can participate/contribute (according to MiBi. They will participate a couple of days).
 - Desy offers electron/positron beams with user-selectable momentum from 1-6 GeV/c.
- Marco Lucchini applied for 1 week at SPS CERN between 17 and 31 July (not confirmed yet):
 - "Electrons / positrons, $E \geq 4$ GeV/c , $E \leq 100$ GeV/c, 1k to 10k per spill, 5 - 25 mm"

info on their application on their meeting (we unfortunately missed) indico page:
<https://indico.cern.ch/event/1354598/>

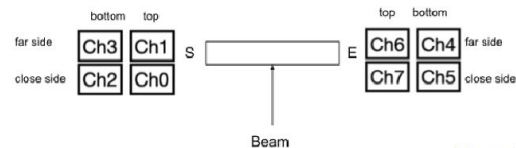
what others already did?

June 2023 Test Beam @Fermilab Setup

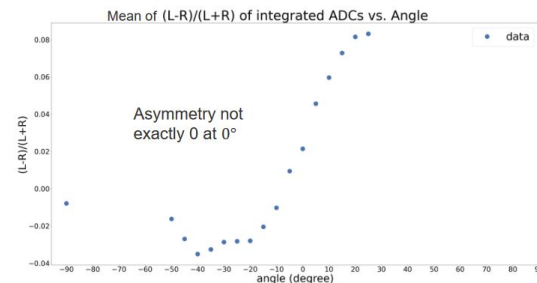
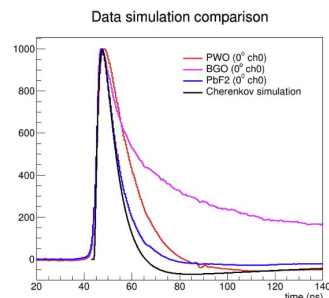
- 120 GeV protons, ~45k protons evenly distributed in 4 s
- Only one spill per minute, 8 mm horizontally and 4 mm vertically
- Only at most one proton expected in our readout window

Crystal	Size	Filter (S side only)	Run #	Angle (°)
PbF2	6x2.5x2.5 cm ³	No filter	11-29	0 to ±90 (10° interval)
PWO		R60	31-66	0 to ±90 (5° interval, except ±85°)
		No filter	103-121	0 to -50 (5° interval), 0 to +25 (5° interval), ±90
BGO		U330	68-101	0 to -45 (5° interval), 0 to +50 (5° interval), -55, -65, -75, ±90

- waveform acquisitions
- timing distributions and angular dependence analysis
- comparison with simulation



Four 6mmx6mm SiPMs on each side
0-3 on the S side
4-7 on the E side



BTF call

Current call cover beam time request from **February 12, 2024 (week 7) up to June 2, 2024 (week 22)**. The submission period end in **January 12, 2024**.

They foresee the next call will start in March 2024, for getting beamtime in Summer 2024, while they claim no beam time will be available to users in Autumn 2024.

BTF call

They assign beam periods in units of weeks, from Monday (starting from 12:00) to Sunday, with an admitted overlap on the subsequent Monday morning (up to 12:00) for setup decommissioning and removal.

We (Marco and Marcello) have identified two possible periods (according to our availability) in which to apply:

- current call: weeks from **May 5 to 27**. (before that we will no be ready).
- next call:
 - weeks in July (June is uncertain for Marco due to resumption of MEG beamtime).
 - September?

BTF occupancy



BTF environment

Beam parameters:

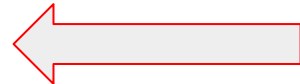
- electron energy up to 500 MeV;
- maximum multiplicity is 10^6 particles/s;
- average of 10 spill/s (24 max), depending on DAFNE operations;

Beam monitoring -> they provide:

- a Silicon pixel detector at the beam output to monitor the beam spot and multiplicity (output data need to be synchronized offline with ours -> may be not trivial);
- a Pb glass calorimeter downstream;

BTF2/BTFEH2 is the line/hall available to users with some limitations:

- **gas feeding is not available.**



BTF application

Player of request

Booking Request Questionnaire

Waiting

Management Request Approval

Team Creation

Waiting Team Members

Request Completed

Period: 2023-04-03 / 2023-04-09

Submitter: Giovanni Lorenzo Napoleoni
BTF (Line2)

Next Step

Next Step

Next Step

Next Step

Selected State

BTF

Experiment Proposal name *

Involved Institutions/Industries/Countries *

Experiment motivation related to requested beam time, scientific discipline, research area and purposes *

Proposal category (mark the right one): *

New - If you are submitting this experiment plan for the first time

Team Leader Telephone Number * *

Device under test description (please describe possible hazards) *

Owned setup to be put in experimental hall, brief description (please describe possible hazards related to)

BTF needed setup, hardware, software and LNF facilities (after handshake with BTF staff) *

Time needed for experiment [contiguous days] *

Time needed for experiment roll in [hour] *

Time needed for experiment roll out [hour] *

Measure Description - Download file (link below) and compile it then upload it

Measure Description file link
[Measure Description File](#)
Measure description file *

+ Choose

Saved files

* mandatory fields

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BTF test beam preparation/readiness (still to be filled)

What we will need:

- a trigger system:
 - Two scintillator fingers in front of the crystal;
 - NIM modules to form the logic;
 - (this is something which resembles the current setup, but we need to work on the finger scintillators);
- mechanics:
 - a small dark box, with a low material budget at the beam entrance window;
 - a mechanical system for the rotation of crystals;
- a DAQ system (strongly depends on new instruments (oscilloscope) arrival time);
 - the current one may be inefficient due to oscilloscope-PC read-out dead time and the low number of channels (2x crystal sipms + 2x fingers already saturate the oscilloscope);
- a simulation of the expected scintillation/cherenkov photons;
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