

Summary: "DRD6_MAXICC"

Name	DRD6_MAXICC
Status	Draft
Activity	Maximum Information Crystal Calorimeter
Period	Protons 2024

Purpose

The Maximum Information Crystal Calorimeter (MAXICC) is a cost-effective homogeneous electromagnetic calorimeter concept designed for e^+e^- Higgs factories and based on high-density crystals readout with SiPMs. The calorimeter design features a moderate longitudinal segmentation and includes the dual readout of scintillation and Cherenkov light from the same active element for optimal integration with a dual-readout hadronic calorimeter. It targets an electromagnetic energy resolution of $3\%/\sqrt{E}$, a time resolution of $O(30)$ ps and a jet energy resolution of about $30\%/\sqrt{E}$ when combined with a dual-readout hadron calorimeter. The construction and testing of such an electromagnetic calorimeter prototype was identified as a strategic R&D activity within the ECFA roadmap and is part of the DRD6 collaboration objectives to be achieved within the next 3 years (task 3.1.2) [1] to inform the FCC feasibility study and the next European strategy for Particle Physics. A beam test using hadrons and a small fraction of low energy electrons is a timely and unique opportunity to identify the baseline sensor technology by a comparison of different combinations of crystal (PWO, BGO, BSO), optical filters and SiPMs.

Changelog

Changed to Status	By User	Date & Time
Created	Marco Toliman Lucchini	Monday, 2023/12/18 13:52:37.074135 (UTC)
Draft	Marco Toliman Lucchini	Monday, 2023/12/18 13:52:37.074135 (UTC)

Beam Configurations

This beam request has 1 beam configuration defined.

Details: "Mixed secondary particles (from primary PROTON beam), 1 GeV/c to 10 GeV/c, 1k to 10k per spill, 5 - 25 mm (3 values)"

Particle type	Mixed secondary particles
Beam polarity	No preference
Number of beam momenta	4
Minimum beam momentum	1 GeV/c
Maximum beam momentum	10 GeV/c
Number beam diameters	3
Minimum beam diameter	5
Maximum beam diameter	25
Intensity scan	No
Intensity in zone	1k to 10k per spill
Vary target intensity	No

Intensity on target

n/a Units

Hardware & Setups

This beam request has 1 hardware setup defined.

Details: "MAXICC Experimental box"

Influence on beam	Setup absorbs beam energy significantly (e.g. calorimeter)
Event rate limitation	1 kHz to 10 kHz
Is compatible with standard beam height	No
Is setup a fixed installation	No
Crane service required	No
Requires gases	Don't know
Cooling required	No

Hardware Devices

There are 3 hardware devices associated with this hardware setup:

Hardware device category	Platform or table
Hardware Device	DESY table
Num instances	1
Is required?	Yes
Details	

Hardware device category	Beam telescope
Hardware Device	Other telescope
Num instances	1
Is required?	Yes

Details 

Hardware device category	Other
Hardware Device	Other user provided device (please describe)
Num instances	1
Is required?	Yes

Details 

Description and Details File

There is no hardware description or details file available for this hardware setup.

Installation in the Experimental Area or Zone

Approx. setup length [m]	1.2
Approx. setup width [m]	1.0
Approx. setup height [m]	0.8
Approx. setup footprint [m ²]	1.2
Total approx. weight [kg]	30.0
Electrical power [VA]	2.0

Floorplan, Installation Plan, Signal Path Plan

There is no file detailing the installation in the experimental area available for this hardware setup.

Installation in the Control or Counting Room

Approx. setup length [m]	2.0
Approx. setup width [m]	2.0
Approx. setup height [m]	2.0
Approx. setup footprint [m*m]	4.0
Approx. total weight of setup [kg]	100.0
Approx. electrical power [W] or [VA]	None

Further Details and Description

There are no further details and descriptions available for this hardware setup.

Safety

This beam request has 1 safety information record defined.

Note:

- The links below have been provided by the colleagues from the CERN EP-TH safety group.
- **The links all require to be logged in / authenticated via single-sign-on (SSO)!**
Please use the "Sign in" link, located in the top left corner on the page!

Details: "Safety Info Record No. 1 for Beam Request Id: 58 and Activity DRD6 MAXICC"

Electrical Safety

Please note the CERN safety information concerning electrical risks available here:

<https://ep-th-safety.web.cern.ch/node/33416>.

Consumes more than 32 A	No
Has live parts accessible to touch	No
Has unearthed metal parts	No
Uses high voltages (> 1000 V)	Don't know
Details regarding electrical safety	

Gas Related Safety Aspects and Hazards

- Please check the CERN safety rules regarding flammable gases, cf. <https://ep-th-safety.web.cern.ch/node/33459>
- Concerning greenhouse relevant gases, please do consider the information and requirements laid out in <https://ep-th-safety.web.cern.ch/node/33452>

Uses flammable gas(es)	No
Uses poisonous, mutagenic, etc. gas(es)	No
Uses greenhouse gas(es) and substance(s)	No
Details regarding gas safety	

Laser Safety

Usage of lasers of class 3R, 3B, or 4 are subject to additional safety rules and requirements, please cf.

<https://ep-th-safety.web.cern.ch/node/33446>.

Uses Laser(s)	No
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Details regarding Laser safety

Cryogenic Safety

The pertinent rules and requirements concerning user of cryogenics can be found under the following link:

<https://ep-th-safety.web.cern.ch/node/33457>.

Uses cryogenics	No
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Details regarding cryogenic safety

Vacuum Safety

Please take also the mechanical safety aspects (most notably the concerns regarding pressurized vessels and piping systems) into account in case your setup requires vacuum technologies:

<https://ep-th-safety.web.cern.ch/node/33522>

Uses vacuum	No
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Details regarding vacuum safety

Mechanical Safety

Please note the CERN safety rules and recommendations concerning mechanical safety available following this link:

<https://ep-ths-safety.web.cern.ch/node/33522>

Uses lifting tools or containments	No
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Uses moving equipment / platform(s)	No
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Uses pressurised vessels or containments	No
Uses piping systems	No
Uses other (fixed) structures	Yes
Details regarding mechanical safety	A metallic box of about 1 m ³ will house the setup in which some light mechanical structure will be used to hold the detector elements in place.

Irradiated Materials, Radioactive Sources and Material

This concerns for example detectors or any materials that have been irradiated.

Please check CERN safety rules and contact the [HSE RP Group](#) if you intend to make an irradiation of material or want to use any irradiated and activated materials.

Uses irradiated material(s) or source(s)	No
Details regarding irradiated material(s) and source(s)	

Runs & Scheduling

This beam request has 1 run defined.

Details: "Run No. 1 for Activity "DRD6 MAXICC" and Beam Request (id: 58) in Periode Protons 2024"

Usage	Exclusive main usage
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Total duration of usage	1 Week(s)
Frequent access required	Yes
Has high target intensity	No
Desired location group	PS Complex (East Area - multipurpose beam lines T9 and T10)
Installation time	No information about the installation time available
Commissioning time	
Deinstallation time	8 Hour(s)

Constraints

For this run, the following constraints should be considered during scheduling:

Id	Type	Relation	Other
97	should be scheduled from	Week 29, Wed 2024/07/17	to Week 31, Wed 2024/07/31

Purpose

No purpose specifically to this run defined.

Assigned Beam Configurations

There are currently 1 beam configuration assigned to this run:

- Mixed secondary particles (from primary PROTON beam), 1 GeV/c to 10 GeV/c, 1k to 10k per spill, 5 - 25 mm (3 values)

Assigned Hardware Setups

There are currently 1 hardware setup assigned to this run:

- MAXICC Experimental box

Assigned Safety Information Records

There are currently 1 safety info record assigned to this run:

- Safety Info Record No. 1 for Beam Request Id: 58 and Activity
DRD6 MAXICC