

RD51 H4(PPE134) 2021 Test Beam

- Physics scope
- Beam requirements
- Infrastructure needs

		Jun				Jul				Aug				Sep				Oct				Nov	
Week		24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Machine																							
North Area	T2-H2 option 2		CMS Outer Tracker 7	SPS & TT20 Setup 7	NA Setup 7	NA61 SHINE 16	FASERcal 7	ATLAS FCAL PULSE 7	STORM 7	LEVER 7	CMS HGCALE 7	NA61 SHINE 7	ATLAS ZDC 7	NA61 SHINE 7	NA65 14	CMS HGCALE 7				NA61 SHINE 33			
	T2-H4 option			SPS & TT20 Setup 7	NA Setup 7	GIF RD51 9	LHCb CAL 18			NA64e 28			GIF 7	LHCF 14	CMS ECAL 14	LHCb CAL 7				GIF RD51 14	HERD 7	GIF 5	
	T2-H4 req.					CMS ECAL 9																	

Mon. 12/07/2021 – Wed. 21/07/2021

Wed. 20/10/2021 – Wed. 3/11/2021

- Yorgos Tsiopolitis, Eraldo Oliveri
- 20th May 2021

Physics Scope (2021)

Generic and Application driven R&D

Muon/Tracking: GEM, mm and μ RWELL

TPC: TimePix (LC), Twin and Tandem GEM TPC
(Beam monitoring)

Timing: PICOSEC micromegas, FTM

Calorimetry: RPWELL (DHCAL)

Medical: mm (Proton Computed Tomography)

Week 28-29	Project/Experiment	Beam Requirements	Reference Team
AMBER upgrade (mm & TIGER)	AMBER upgrade (mm & TIGER)	mu	INFN Torino
RPWELL	DHCAL	mu, pi	WEIZMANN
BES III	Upgrade of current inner drift chamber with a cylindrical GEM	mu, pi	INFN Ferrara
PICOSEC	Fast and Precise timing with MPGD (micromegas)	mu, e-	PICOSEC Coll.
SRS/VMM3a Gem TPC	Beam Monitoring TPC	mu, pi, high rate	HIP-GDD
TPC-TimePix (?)	Detector commissioning	mu, pi	Nikhef
Tandem Gem TPC (?)	Beam Monitoring TPC	mu, pi	Wigner
RD51	New FE&DAQ for beam telescopes (SRS/VMM3a)	mu, pi, high rate	RD51 VMM

Project driven R&D

HL-LHC: GEM (CMS), mm (ATLAS) and μ RWELL
(LHCb)

FCC-ee: μ RWELL (IDEA)

PBC: mm and GEM (AMBER/COMPASS++)

Week 43-45	Project/Experiment	Beam Requirements	Reference Team
COMPASS Upgrade	AMBER upgrade (mm & TIGER)	mu	INFN Torino
RPWELL	DHCAL	mu, pi	WEIZMANN
COMPASS++/AMBER	COMPASS++/AMBER upgrade (GEM)	mu	BONN-GDD
CMS	GE2/1, ME0	mu, pi	CMS GEM
IDEA project	μ RWELL	mu	LNF μ RWELL
FTM, High Resolution GEM	FTM, GEMs	mu, pi	INFN Bari
Small Pad Resistive mm & embedded readout	Small Pad Res. Mm	mu, pi	INFN Roma 3, Naples, CERN
SRS/VMM3a Gem TPC	GEM TPC	mu, pi	HIP
PICOSEC	Fast and Precise timing with MPGD (micromegas)	mu, e-	PICOSEC Coll.
Proton Computed Tomography	Detector commissioning / Med	mu	LMU
Tandem Gem TPC	Beam Monitoring TPC	mu, pi	Wigner
RD51	New FE&DAQ for beam telescopes (SRS/VMM3a)	high rate pi	RD51 VMM
RD51	RD51 μ RWELL telescope	mu, pi, high rate	RD51 μ RWELL tracker

Detector Commissioning

e+e- collider : CGEM(BESIII)

FE electronics and DAQ

TIGER-GEMROC

VMM3a-SRS

More info @ <https://indico.cern.ch/event/989298/timetable/#20210219.detailed>

Beam Requirements

Week 28-29:

1. μ, π : **highest rate** as possible (**limited previously by radiation alarm(*)**). Polarity and momentum not important (the configuration offering the highest rate is the preferred one). We would like to **change from muons to pions several times** during the beam period as we did in the past (informing GIF++ in advance).
2. e [?]: **100GeV/c** for **4-8h** (middle or end of the beam – can be just before MD if better). **STILL UNDER DISCUSSION**

Week 42-44:

1. μ, π : **highest rate** as possible (limited previously by radiation alarm). Polarity and momentum not important (the configuration offering the highest rate is the preferred one). We would like to **change from muons to pions several times** during the beam period as we did in the past (informing GIF++ in advance).
2. e : **scan 20-250GeV/c** for about **$\approx 24h$** (middle or end of the beam – can be just before MD if better). Cherenkov detector upstream (zone PPE124) for triggering or for measuring precisely the purity of beam configuration. **[UNDER DISCUSSION]**

(*) with μ and π we usually went up to few 10^4 and 10^6 per spill (4-5 sec) respectively. It would be useful to investigate if we can safely increase the rate (1 order of magnitude more would be really appreciated – studies @ higher rates and statistics).

Infrastructure Needs

Infrastructure Needs (NA)	Week 28-29	Week 42-44
PPE 134 Installations	Upstream/inside/Downstream Goliath (beam pipe to be removed everywhere)	Upstream/inside/Downstream Goliath (beam pipe to be removed everywhere)
GAS zone (887/R-C47)	Installation of several non flammable cylinders	Installation of several non flammable cylinders
Flammable Gas Operation (*)	2 lines form 909: (Ne/CF ₄ /C ₂ H ₆ 80/10/10), 1 line (Ar/iC ₄ H ₁₀ 90/10)	3 lines form 909: (Ne/CF ₄ /C ₂ H ₆ 80/10/10), (Ar/iC ₄ H ₁₀ 90/10), (mixture with iC ₄ H ₁₀ - tbc)
Desy Table	2	2
XSCA Table (**)	1(?)	2
Survey (detector alignment)	Yes	Yes
GOLIATH	NO	?

(*) Important to have support night/week-end and reading of pressure on a daily basis – 909 not accessible to users

(**) LAPP table that we used in the past would fit as well with our needs.

INSTALLATION Week 28-29 (9days of beam) :

- It would be important to move (crane) our staff in the week before (we can then work on the week-end).
- It would be important to have access to area and CR in the weeks before to start some installation (no problem if beam line will be occupied by the beam pipe).
- It would be very good if beam pipe would be removed on Friday 9th of July.

CONTROL ROOM & COVID:

- Several groups (shifters) running in parallel (potentially up to 6 team in July and up to 12 in October)