

ECAL test beam 2016

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CMS ECAL VFE phase II upgrade workshop, May 2016

SPS schedule 2016

SPS user schedule for 2016



schedule issue date: 04-May-2016

Version: 2.1

LHC Exp.

PS/SPS Exp.

INT Exp.

Other Exp.

		Apr					Mai					Jun					Jul					Aug					Sep					Oct					Nov					Dec									
Week		13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50												
Machine																																																			
North Area	T2 - H2	TT20 Setup 16	RE19 CREAM 7	CMS GEM / RPC 14	NA61 PSD/SaFi/DRS4CAL 14	CMS ECAL (Solcal) 14	LHCb RICH 7	NA61 VD 7	NA61 FTPC 21	SHIP 14	ALICE ITS 7	RD51-BESSIE 7	HERD 7	CMS HGCALE 7	NA61 neutrino 42					NA61 pp 21					RE19 CREAM 7	NA61 SHINE 28																									
	T2 - H4	TT20 Setup 16	GIF 19	NA63 14	RD51 & GIF 14	CMS ECAL 21	NA64 14	PHOTAC CHANNEL 7	CMS ECAL & GIF 14	RD51 & GIF 14	RE25 CALET 7	GIF 14	CMS ECAL 7	RD51 & GIF 14	NA64 28					RE19 CREAM 7	ATLAS ZDC 7																														
	T4 - H6	TT20 Setup 16	ATLAS AFP 5	RD42 7	CMS Outer Tracker 7	CERF 7	ATLAS ITK 14	ATLAS BCM/ITK 7	RD42 7	CMS ECAL 7	ATLAS AFP 14	ATLAS Strip Trk 7	ATLAS NSW 7	AIDA WP7 7	ATLAS ITK 14	ATLAS BCM/ITK 7	CMS ECAL 7	RD42 & Monopile 7	ALICE FOCAL 7	ATLAS AFP 14	CMS Outer Tracker 7	CMS ECAL 7	ALICE PHOS 7	ALICE & ATLAS muons 7	ATLAS ITK 14																										
	T4 - H8	TT20 Setup 16	TOTEM Tuning 5	LHCb 21	ATLAS mu 7	TOTEM Tuning 7	ATLAS Tilecal 14	UA9 Tunes 7	ATLAS mu 7	TOTEM ATLAS TRT 7	LHCb 21	TOTEM PPS 7	ATLAS TRT 7	LHCb 21	TOTEM FEH 7	ATLAS mu 14	UA9 Tunes 7	ATLAS Tilecal 14	RD52 DREAM 14	LHCb 21	UA9 Tunes 7	RE25 CALET 7	NUCLEON 5																												
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TT41		AWAKE Commissioning 112															AWAKE 42										AWAKE (T.B.C) 28																								

Three ECAL periods at H4:

1. 8-29 June
2. 27 July – 10 August
3. 21-28 September

One remaining ECAL periods at H2:

1. 1-8 June

Two more H2 Electromagnetic Calorimeter periods in September and November are now assigned to HGCALE



Building 887 extension



27/10/2015

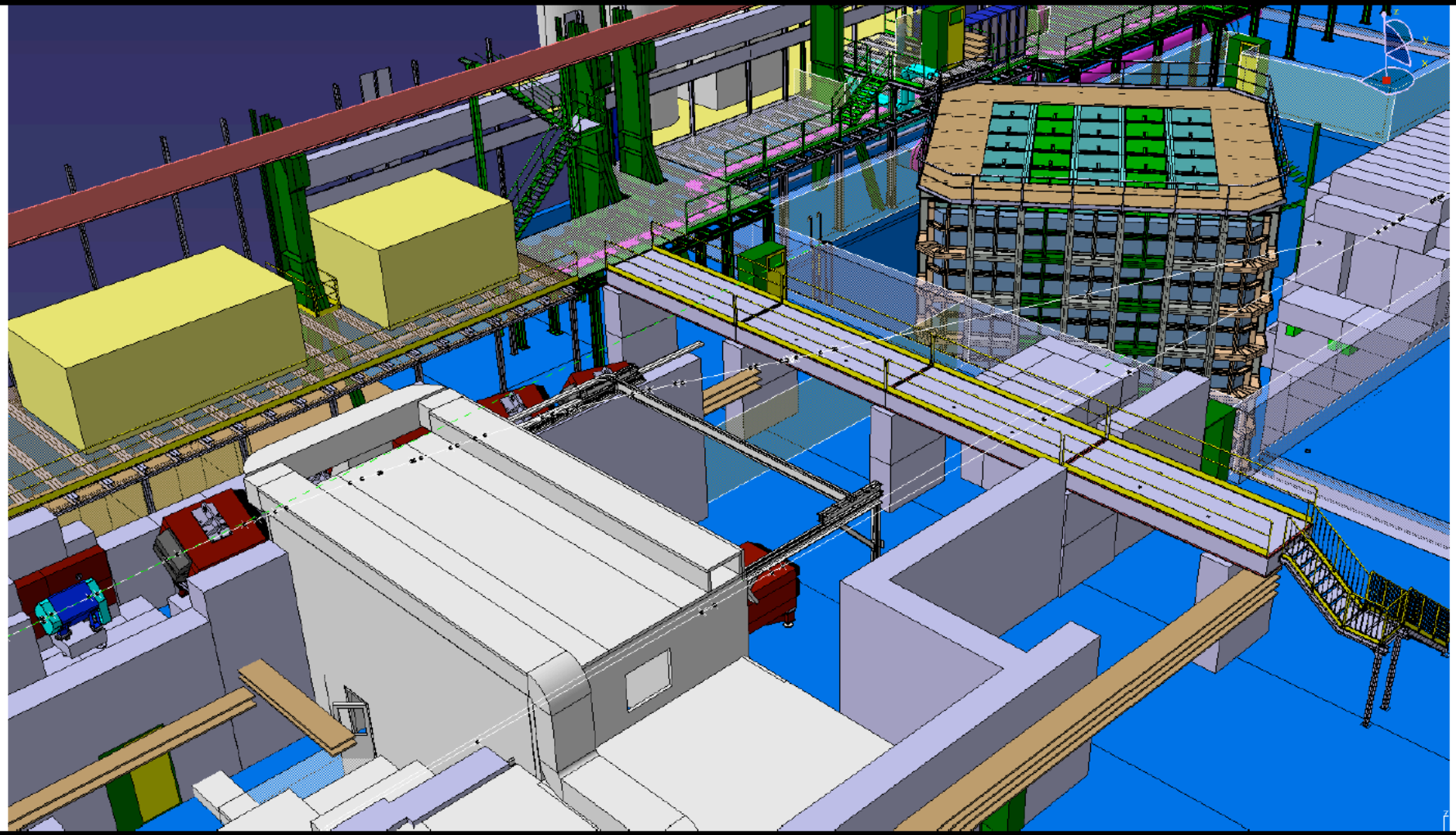
S. Girod EN-MEF

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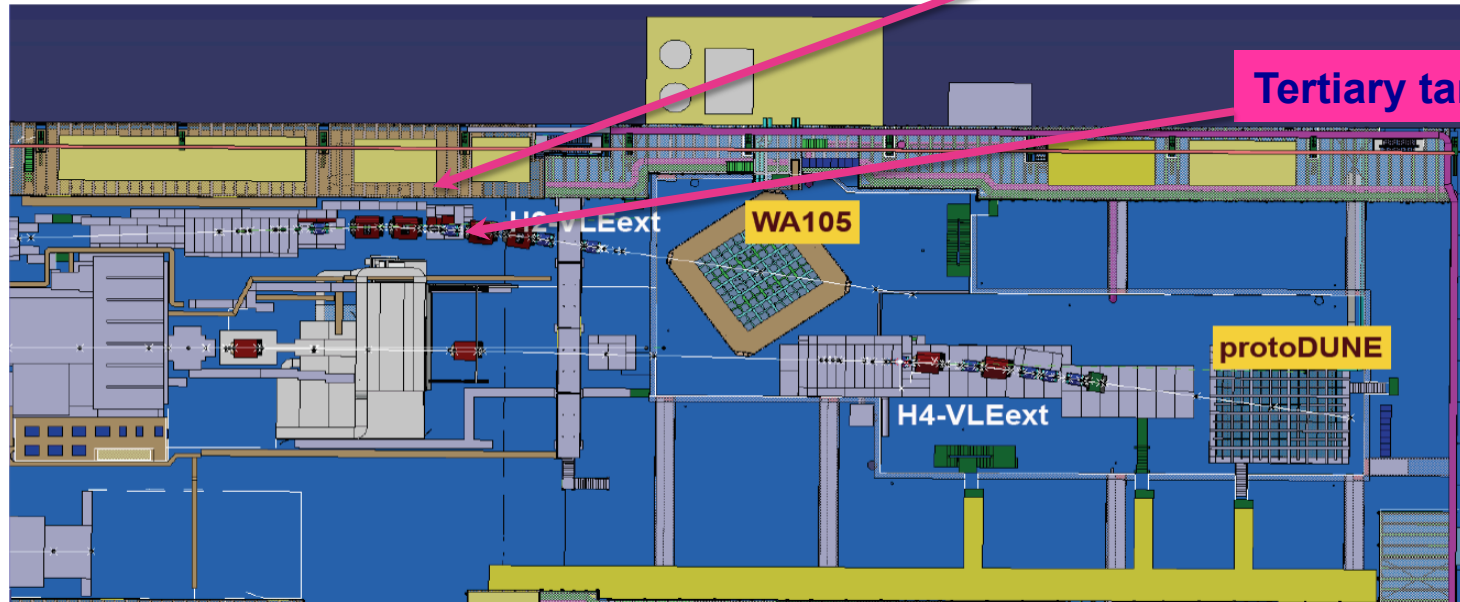
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New HNA164 zone



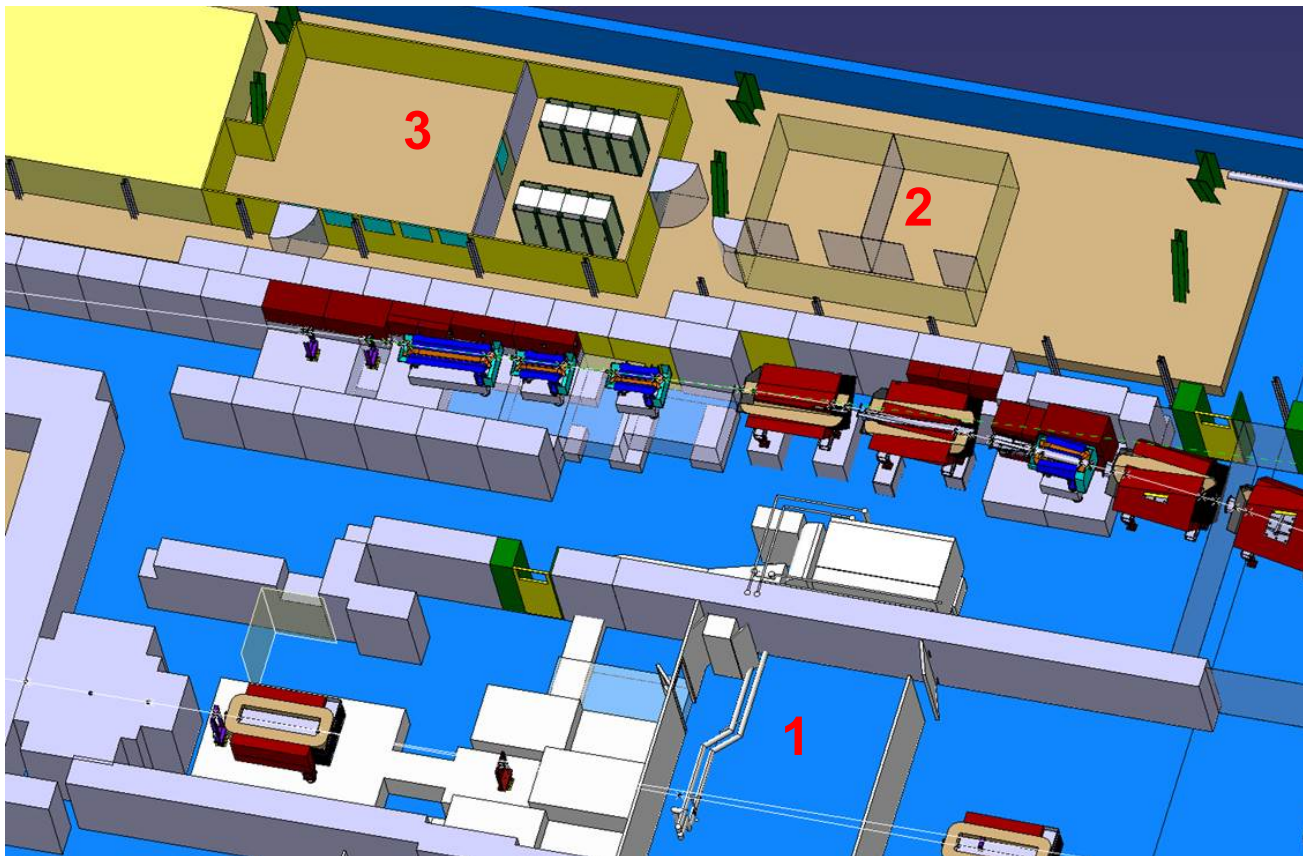
New HNA beams

EHN1 Extension - General Layout



- ▶ H2 extension to **WA105** cryostat: **1(0.5) ÷ 12 GeV** tertiary beam ~60m per beam line
- ▶ H4 extension to **DUNE** cryostat: **1(0.2) ÷ 7(10) GeV** tertiary beam [30m high-energy + 30m VLE]
- ▶ Beam characteristics:
 - Use secondary beam of 80 GeV (π/p , or e) to produce the tertiary low-energy beams on a secondary target
 - VLE beams : mixed **hadrons** (π^\pm , μ^\pm , K^\pm , p), \sim pure **electron** (e^\pm) beams

New HNA 164 zone



Three areas:

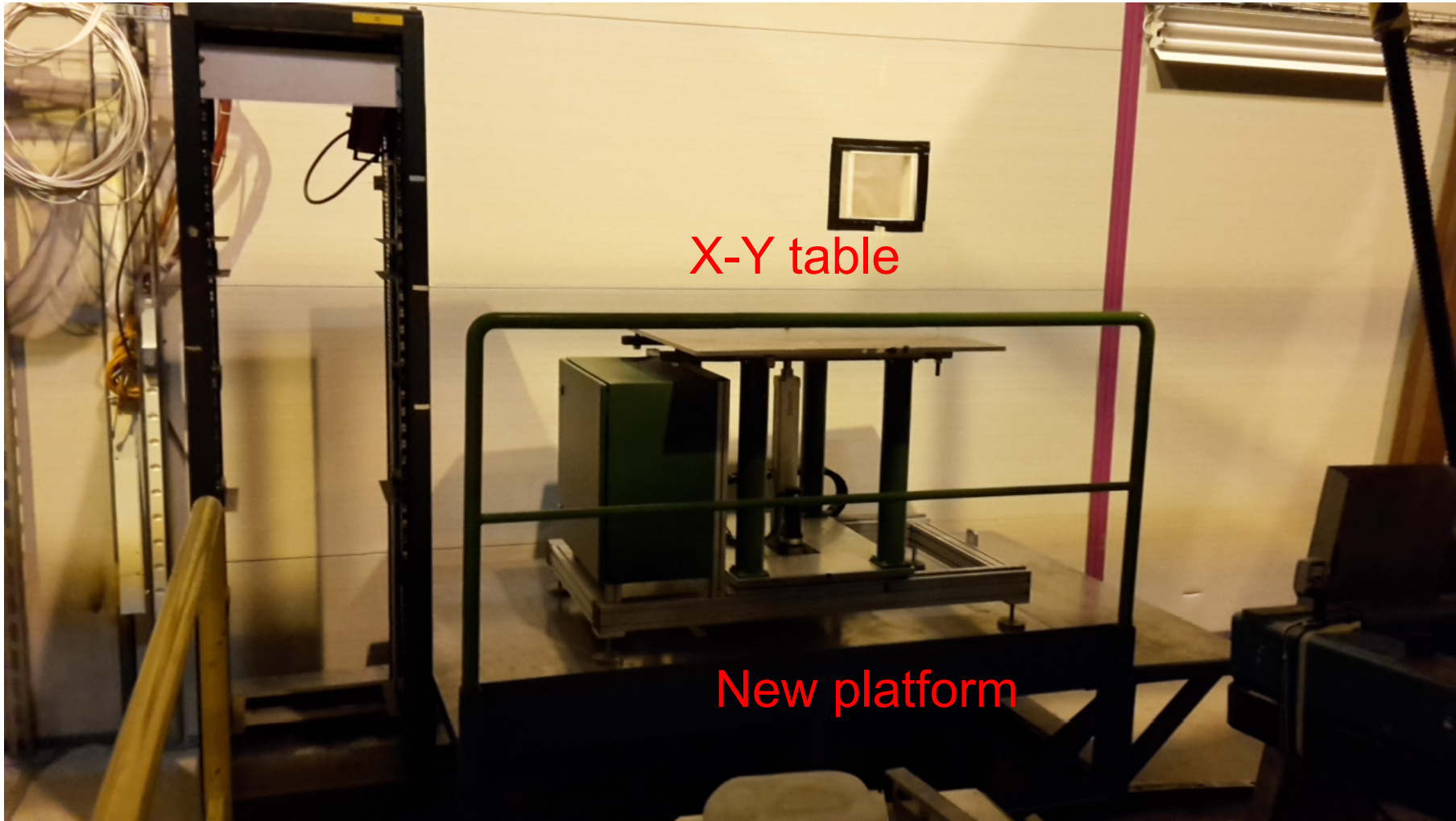
1. Beam area
 - Cable trays
2. Laser barrack
3. Counting room

New CMS ECAL H4 beam area

- ▶ More electronics in the beam area
 - ▶ SPS rack with one VME , two NIM crates and DAQ PC
 - ▶ 8 network outlets
- ▶ Reasonable set of cables between beam area and counting room
 - ▶ Signal and HV cables for one full TT/SC
 - ▶ 15 low loss signal cables – good quality pulse measurement in the counting room
- ▶ Beam trigger available in both, counting room and beam area

H4 beam zone, 11 May 2016

Cable tray



Status of H4 hardware installation

- Beam zone
 - Light & electricity installation - on-going
 - New table support done
 - Cable trays inside air-conditioned hut - done
 - Local crane on-going
- New barracks
 - Walls & doors done
 - Connection to the electrical network - done
 - Air conditioning: - waiting for the power installation
 - Racks - done
 - Cable trays - done
- Cables between the beam zone and the barrack 50% done, will be finished this weekend

Should be ready for the DAQ installation/commissioning mid-next week

Time sharing between sub-projects

... we request :

0) **One week of beam time at H4 for re-commissioning** of the CMS ECAL experimental area. This should be scheduled as soon as the H4 area infrastructure is restored. We currently assume this to be in June 2016.

The individual test beam requests are then, in chronological order :

- 1) We request **10 days** of beam time in May in the **H2** beam line for testing of various precision timing detectors. This test will include calorimeter precision timing options as well as stand alone precision timing detector configuration. A precision timing enhancement of the ECAL barrel, the HGAL as well as a thin layer precision timing detector are being discussed in the context of the CMS Phase II upgrade.
- 2) We request **two weeks** of beam time (one in summer, one in fall) at the SPS **H4** beam line for the **ECAL Barrel longevity studies** for HL-LHC. The purpose of these tests is to continue measurements of the ageing and radiation damage effects on the ECAL detector components that we anticipate at the HL-LHC, and to measure the pulse shape of direct ionization signals and scintillation light in the photo-detectors (Avalanche Photodiodes) produced in high energy electromagnetic and hadronic showers. We also plan to test various double readout configurations with CMS-like readout electronics, building on an initial proof of principle test in 2015.
- 3) We request **1 week** of beam time in June or later in **H4** for testing a **precision timing** capable PbWO crystal matrix. This test will study in detail a precision timing enhancement of the CMS ECAL barrel for HL-LHC using faster readout for the existing CMS ECAL APDs as well as advanced tests with fast photo sensors.
- 4) We request **10 days** of beam time in June and **10 days** in fall at the SPS **H4** for **HL-LHC driven calorimeter R&D** with focus on EM performance and finishing the calorimeter R&D effort on Shashlik calorimeters. The R&D program which started in 2013 is coming to a closure with prototypes becoming available which fulfill the requirements set by the operation at HL-LHC in terms of energy resolution, radiation hardness and compactness.
- 5) We request **1 week** of beam time in fall in **H4** to test prototypes of the **CMS ECAL barrel front-end electronics** upgrade for HL-LHC.

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SPS performance is not very good so far → possible rate limitation → high energy beam rates

Three ECAL periods at H4:

- 8-29 June 21 day irradiated crystals timing, LYSO & CeF3 shashlyk
- 27 July – 10 August 14 days precision timing (? If not done at H2) + VFE (if ready)
- 21-28 September 7 days new VFE / FE

Do most of the generic calorimeter R&D during the first period and reserve the second and third for the EB electronics upgrade