nT2 integration in CMS

current status and plans of activity in 2020

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Parametric drawing

Collar shielding

T2 services region

T2 sensitive region

IP5 beam axes

D90\text{mm} \rightarrow \eta=6.51
D100\text{mm} \rightarrow \eta=6.4

dimensions in mm
In 2019 (performed):

- **TDR**, Endorsed by LHCC in September, Approved by Research Board in September.
- Scintillator, WLS, fiber choice;
- Cosmic and source tests in B.226
- DESY beam tests (2019, May and September);
- Mechanical Mock-up in P.5

**Plans:**

**In 2020** readout (SiPM), mass-production (4 sets), assembly, tests, PP and cabling on CMS, adaptation on Collar table.

**In 2021** installation / adjusting test on both CMS Ends.

Roman, Sasha works: mock-up, tests, assembly, gluing of WLS and fibres (+Berkan), milling of the grooves (good experience), …
Mock-up

**Full-scale nT2 mock-up**

**Full-scale mock-up (T2, BCML2, VFD, Rad. facility, ...)**

Mechanical Mock-up in P.5
Next steps: fibres routing, PP, fast installation/removal tests, ...
Mock-up completely simulates the CMS Forward area where nT2 will be installed. Also, the Mock-up is completely identical to nT2 in which the scintillator tiles are replaced with exactly the same ordinary plastic tiles.

Mock-up consists of:
- the table with vertical cables groove,
- Shielding plates around the Beam Pipe,
- New CT2 Beam Pipe,
- Two (left and right) nT2 quarter with its fibres bundles and PP.

Installation/removal position

Run configuration

- CASTOR table
- Beam Pipe
- nT2 quarters
- Shielding plates
- IGUS sliding support, Fixation and adjusting mechanism
- Fibres
  - 4x4x4=64 ch. per side
Services routing

HF-shielding plug

VFD CMS reserved space

BLM

BCML2

nT2 PP - 400x250x170mm

CASTOR table

Collar platform

Collar shielding

Motor

T2 cables chain

BCM2 cable chain

new cables line for nT2

nt2 PP

BLM

BCML2
**VFD on CMS**

Nine VFD modules are assembled in one design, forming two symmetrical detector halves mounted around the Beam Pipe (CT2 part) on the distance at 14.5m from IP5 on both CMS Ends.

Z=14330

FTL
DAQ and Trigger

CASTOR: 14 x 8 = 112 ch.
nT2: 4 x 4 = 16 ch.
The (-) site is mirror reflection of the (+) site.
Gas flexible hoses
Cooling plastic pipes