Summary of requests collected for GIF++

ATL-MDT

Contact persons:

Korbinian Schmitt-Sommerfeld

Oliver Kortner

Massimo Corradi

Setups:

ATL-MDT detector (#1) and ATL-Phase-II system test (#2)

The ATLAS-MDT test beam campaign 2017 at the GIF++ aims at the performance measurement of sMDT-chambers and readout electronics. The 2016 measurements showed a sMDT rate capability of up to 100 kHz/cm^2 using the 14 TBq Cs-137 source to simulate the expected cavern background. In order to use this chamber capability to full capacity, new electronics is needed. Two new electronic prototypes will be investigated. First, a fast readout track, that enables the usage of the MDT signals for online track reconstruction, which will be needed in ATLAS after the HL-LHC upgrade in order to limit the muon trigger rate. Second, new analogue readout electronics, that increase the spatial resolution especially at high rates, using baseline restoration to reduce signal deterioration in case of signal pile up.

Beam request:

3 periods of 2 weeks each: total 6 weeks

ATL-MM

Contact persons:

Barbara Alvarez Gonzalez
Paolo Iengo
Yan.Benhammou
Tatsuya Masubuchi
Zhen Yan

Setups:

ATL-MM (#3), ATL-NSW-MM-mod0 (#4), ATL-NSW-MM_resistive (#5), ATL-NSW-MM-prod (#6)

ATL-MM (#3): Micromegas R&D for CERN ADE-MU group.
Several R&D activities for this setup:
- Ageing studies: monitoring the current, efficiency and noise stability as a function of integrated charge
- Particle rate: studying the detector sensitivity to photons from the source
- Tracking with muon beam: checking the detector resolution under high radiation

ATL-NSW-MM-mod0 (#4): long term evaluation with final components and HV stability (full 2017 period).

ATL-NSW-MM_resistive (#5 – only gamma irradiation): the final goal is to qualify the resistive material for the construction of the Micromegas detectors for the NSW project.

The test plan is to install 2 small MM chambers (approximately 10x10 cm2 active area, 40x40 cm2 envelope) in the CERN MM setup (no extra space needed), at 1 m from the source.

The test is expected to start approximately in March to last about 2-3 months to accumulate enough charge. It is a pure irradiation test; thus no beam is required.

ATL-NSW-MM-prod (#6 – only gamma irradiation): irradiation test with all production modules (128 quadruplets in total, 1-2 quadruplets per week foreseen).

Beam request:

3 periods of 2 weeks each for setup #3

2 periods of 2 weeks each for setup #4

ATL-NSW-TGC

Contact persons:

Yan Benhammou

Gerardo Vasquez

Henso Javier Abreu Aguilar

Setups:

ATL-NSW-STGC-mod0 (#7 – only gamma irradiation): Long term evaluation with final components (few months).

ATL-NSW-STGC-prod (#8 – only gamma irradiation): Irradiation test with all production modules. Only 2 hours per week with maximum irradiation (no filter, i.e. ABS=1). 4-5 detectors per week at the same time.

ATL-NSW-STGC-ELX (#9): Study resolution as a function of irradiation level. Measure pad efficiency. Test of new electronics.

Beam request:

2 periods of 2 weeks each for setup #9

ATL-RPC

Contact persons:

Giulio Aielli

Alessandro Polini

Setups:

ATL-RPC (#10), ATL-BIS78-mod0 (#11)

ATL-RPC (#10): General R&D for the development of the new RPCs for ATLAS Phase 1 and 2 upgrades. The aim is to test and measure the performance of prototypes being developed to withstand the HL-LHC radiation level in the ATLAS muon trigger. The prototypes will be designed to test the different aspects of the new RPC technology: FE electronics, gas gap layout, readout panel, new materials and new gas mixtures. The measurement foresees two phases:

- intensive beam test sessions to extensively check performance
- long accelerated ageing sessions to integrate the expected equivalent of ATLAS operation.

ATL-BIS78-mod0 (#11): Final RPC prototype validation for ATLAS Phase 1 upgrades. The aim is to test and measure the performance of the final prototype being developed ATLAS Phase-1 muon trigger upgrade program (BIS78 project). The measurement foresees two phases:

- intensive beam test sessions to extensively check performance
- long accelerated ageing sessions to integrate the expected equivalent of ATLAS operation.

Beam request:

2 periods of 2 weeks each for setup #11

BE-BI-BL BLM

Contact persons:

Slava Grishin

Ewald Effinger

Christos Zamantzas

Setups:

BE-BI-BL BLM (#12 – only gamma irradiation): Validation of Beam Loss Monitors for CERN accelerator complex.

Beam request:

No beam requested

CMS-CSC

Contact persons:

Ekaterina Kuznetsova

Victor Perelygin

Setups:

CMS-CSC1 (#13), CMS-CSC2 (#14), CMS-CSC3 (#15)

Longevity and performance studies for HL-LHC.

The goals for TBs are:

- measurements of chamber performance after every 0.2-0.5 x HL-LHC dose accumulation.

- CSC DAQ and trigger performance studies under background occupancies similar to HL-LHC expectations.

Beam request:

3 periods of 2 weeks each for setup #13 and #14.

Only gamma irradiation for setup #15

CMS-DT

Contact persons:

Daniel Teyssier

Ignacio Redondo

Jacopo Pazzini

Domenico Dattola

Setups:

CMS-DT-MB1 (#16), CMS-DT-bycells (#17)

Irradiation campaign closer to CMS-DT HL-LHC conditions

Muon beams needed to measure impact on detector and electronic performance

Beam request:

2 periods of 2 weeks for setup #16.

Only gamma irradiation for setup #17

CMS-GEM

Contact persons:

Lisa Borgonovi

Marek Gruchala

Ilaria Vai

Setups:

CMS-GEM1 (#18), CMS-GEM2 (#19)

Muon System, R&D phase II upgrade with MPGD. R&D motivations:

CMS Muon System, R&D phase II upgrade with MPGD. R&D motivations:

Need to qualify the behaviour and performance of GEM detectors and optional prototypes (uRWELL and FTM detector) in a harsh radiation environment. In particular:

- CMS-GEM1 setup is dedicated to a longevity study of Triple-GEM detector, with the aim of reaching the integrated charge of the new ME0 station (at least 200 mC/cm2 plus safety factor)
- CMS-GEM2 setup is dedicated to test beam and longevity studies for the new prototypes, in particular uRWELL and FTM detectors. With the test beams we need to prove rate capability as well as basic performance (efficiency, time and space resolutions) in a radiation environment. We also need to reach the ME0 integrated charge for the longevity test.

Beam request:

3 periods of 3 weeks for setup #19.

Only gamma irradiation for setup #18

CMS-RPC

Contact persons:

Nicolas Zaganidis

Salvador Carrillo

Imad Laktineh

Setups:

CMS-RPC1 (#20), CMS-RPC2 (#21), CMS-RPC3 (#22)

During Run 1 and Run2 the CMS RPC- system operated well inside its design radiation tolerance (i.e. no aging effects were observed). In the future, the RPC detectors and their associated electronics should operate at much higher luminosities and therefore they will accumulate the high dose expected corresponding to an integrated luminosity of 3000 fb^{-1}.

Consolidation studies of the present CMS-RPC system (#20)

At GIF++ we are irradiating four spare endcap chambers. Assuming a gamma background conditions of 2 kHz/cm2, the goal is to integrate the change equivalent to 10 years HL-LHC in less than 2 years. During the irradiation tests, which will continue during 2017 and 2018, the following studies are performed:

1. The electrode Bakelite bulk resistivity is regularly measured

2. RPC current and counting rate monitoring in presence of high gamma background

3. Chamber rate capability is being periodically studied with muon beam, when available, in presence of different background rates

R & D activities for the future upgrade (#21, #22)

Since 2015 an intense R&D activity is ongoing at GIF++ in the framework of a proposal aiming in completing the upgrade program of the Muon System by instrumenting the RE3/1 and RE4/1 regions with an improved version of RPCs. The new chambers would complement the existing ME3/1 and ME4/1 stations, currently instrumented with CSCs only, providing robustness to the L1 muon trigger where redundancy is today missing. Several prototypes with different technologies are under study in the GIF++. The R&D target is to identify the RPC technology which fulfils all the HL-LHC requirements during 2017. Once it is identified, irradiation tests will be performed to evaluate any aging effects during the full HL-LHC period. This tests will last until 2019.

Beam request:

3 periods of 2 weeks for each setup (#20, #21 and 22).

EP-DT

Contact persons:

Beatrice Mandelli

Roberto Guida

Setups:

EP-DT1 (#23): R&D on gas systems and gaseous detectors

Study of GEM detector performance under gas recirculation with different gas mixture and different gas system operation condition. The goal is to integrate a charge/dose equivalent to the HL-LHC with detectors operated with gas recirculation systems.

EP-DT2 (#24): R&D on gas systems and gaseous detectors

Study of RPC detector performance with new environmentally friendly gas mixtures. The goal is to test alternative gas mixture allowing to replace R134a and/or SF6 from the currently used RPC gas mixture.

Beam request:

1 periods of 1 weeks for each setup (#23 and 24).

RE21 (CBM)

Contact persons:

Christoph Blume

Cyrano Bergmann

Walter F.J. Mueller

Setups:

RE21_CBM (#25): R&D on MWPC

MWPC prototypes with up to 16 ASICs will be tested under gamma irradiation using the muon beam as reference signal. We would like to evaluate the impact of different gamma intensities on the space charge build up by measuring the energy loss spectrum correlating the beam reference detectors of GIF++ with our DAQ.

Beam request:

1 periods of 1 weeks (#25).

Conclusions

After discussions at the GIF weekly meeting, I combined the requests into the following schema:

1st period: May 15 to May 31;

2nd period: July 20 to August 8;

3rd period: October 5 to October 22;