

Minutes of first GRAIN Working Group

24 March 2022

Lea Di Noto, Alessandro Montanari

The Zoom meeting starts a few minutes after 11:00 AM CET.

People connected at this meeting:

- Paolo Bernardini
- Rosella Cataldo
- Valentina Cicero
- Simone Copello
- Giovanni De Matteis
- Lea Di Noto
- Marco Guerzoni
- Gianfranco Ingratta
- Nicoletta Mauri
- Alessandro Montanari
- Giuliano Laurenti
- Valerio Pia
- Gianluigi Piazza
- Alessandro Ruggeri
- Antonio Surdo
- Nicolo' Tosi
- Matteo Vincenzi

The agenda, suggested by C.S.Montanari, for this first meeting is presented:

- 1) Define a person or a method (recording of the meeting) to take minutes.
- 2) Discuss and define the scope of your activity to some level of detail having in mind that the final goals are the completion of the detector installation and the readiness for operation.
- 3) Define an initial set of deliverables and the related time schedule.
- 4) Make an initial survey of the available resources and identify possible deficiencies.
- 5) Define at least two referent (a chair plus a co-chair) persons for your working group to take the responsibility to call and organize meetings and coordinate other activities (this does not need to be the "initial" chair)

Discussion of point 1)

Paolo Bernardini suggests to record the meeting by using the appropriate tool in Indico. Lea and Alessandro agree with this proposal but suggest to take also written minutes of the meeting because it is faster and easier to have a summary of what has been discussed and decided in the meeting. For the moment we do not assign the task to a specific person but it will be chosen each time. For this

first meeting Lea and Alessandro volunteer to write the minutes. They will also prepare the Indico agenda for next meeting ready to be recorded.

Discussion of point 2)

People attending to the meeting agree that the Working Group is going to work on the following items:

- Cryostat
 - Mechanics
 - Cryogenics
 - Monitoring
- Detector (Lens/Hadamard)
 - Design
 - Electronics
 - Prototyping
 - Simulation/Reconstruction tool development as an update
 - Keep the technical meeting on Thursday at 14:30
- Physics requirements and achievement as an update
 - Keep the studies and discussions in SAND Physics meeting on Friday at 14:00

One of the major tasks of the meeting is to create a forum in which people working in the different areas can exchange information and define reciprocal requirements. For example, Cryogenics define what is the maximum power that can be tolerated, electronics should be designed so that this requirement is respected. At the same time electronics receives input from simulation and reconstruction that translates in number of channels and type of photosensor. The output of electronics impact on the mechanics (supports, feedthroughs). At top of all the Physics should pose constraints on the requirements of GRAIN parts.

More technical and detailed discussion for Simulation/Reconstruction and Physics will be kept in the already programmed regular meetings. But when relevant items arise from these meetings, an update should be given also in GRAIN WG by expert peoples. This will be useful also to limit the number of meetings to be followed, since we would like that attending the GRAIN WG will be sufficient to be informed on all the various activities.

Discussion of point 3)

It has been agreed to set the following deliverables:

PROTOTYPING & TESTS:

- defining a plan for prototyping and tests for lens and Hadamard sensors and for cryostat (end of May)

DESIGN:

- Integration/optimization of detectors inside the cryostat, according two options:
 - Lens + Hadamard

- SiPM only
- First estimate of electronics requirements for SiPM matrix readout based on 1 kW of maximum power dissipation
 - Number of channels, dynamic range, time window, ...
 - Towards an ASIC development

Timeline: by end of September 2022

- First estimate of sensor layout and performances:
 - Number, type of detectors,
 - Position of the detectors in the cryostat

Timeline: by end of September 2022

- Finalization of cryogenic facility based on 1 kW maximum power dissipation (as baseline option)
 - general scheme done

Timeline: by end of October

- Definition of first baseline version for GRAIN detector
 - definition of cryostat dimensions and sensor layout considering:
 - input from detector simulations and tests
 - input from STT design and simulations

Timeline: by end of December

Discussion of point 4)

The WG agrees that the development of an ASIC suitable for our application is on the critical path. For the designed prototypes, the material is already available, and no additional resources are necessary.

Discussion of point 5)

Lea and Alessandro agree to continue respectively as chair and co-chair, at least for now.

It is agreed to keep Thursday at 11:00 AM CET as meeting time. It is remarked that the duration of the meeting should be kept in 1 hour (1 and ½ hour only the agenda is very dense). The meeting will be bi-weekly with agenda defined in advance.