**Taskforce Weekly Plenary Meeting**
***Agenda, 20 January 2025***

**Meeting time:** 14:30 – 16:00 CET

**Zoom meeting room:**

<https://cern.zoom.us/j/64071474060?pwd=ZjZSaGJwVUZJSjU0b1p3WHllU3Nudz09>

Attendees: All task force members

Chair: Fiodor Sorentino

* **Filter cavity positioning (M. Vardaro)**

***14:30-15:00 CET***

**Point presented by:** Marco Vardaro

**Point submitted for:** information and discussion

A major difference between current detector layout and the ESFRI proposal is the presence of 5 km long filter cavities requiring separate tunnels, which is expected to generate substantial extra cost for the civil infrastructure. Within the ISB quantum optics division, an ongoing study is focusing on available options to mitigate the requirements on infrastructure from filter cavities; in particular, the study is addressing the possibility to reduce the beam pipe diameter, to push filter cavities closer to each other, to align filter cavities on a different plan than the main interferometer, to have filter cavities on both sides of a vertex, to have different length for filter cavities, to replace two filter cavities by a single, 3-mirrors filter cavity.

**Summary of Discussion:**

Sebastian Steinlechner provided an update on the work done by the squeezing work package (ISB quantum optics division) to explore alternative configurations for placing the filter cavities, with the goal of reducing infrastructure costs. As explained in the background text of this agenda topic, several options were discussed to mitigate the requirements on infrastructure from filter cavities. The team is preparing a document to share their findings by the end of January. The document will be shared on TDS as a separate work from the task force work.

The discussion explored the possibility of placing the filter cavities inside the main arm tunnels rather than in separate tunnels. This could potentially save costs, but raises challenges around beam sizes, suspension systems, and integration with other subsystems. The group agreed to further investigate the feasibility and tradeoffs of this approach, focusing on defining the minimal requirements rather than proposing specific solutions. After this discussion, the tradeoffs of reducing the length of the filter cavities from 5 km to 1 km were considered, as proposed in a separate R&D effort. While this could potentially save costs, it would impact the performance and sensitivity of the detector. The team agreed that the task force should focus on maintaining the detector sensitivity while exploring ways to reduce infrastructure costs. Patrick Werneke also mentioned that the tower height is important as they need to be transported through the main arm tunnels. The discussion was concluded by the ETO Director Andreas Freise stating that some of the options considered are overoptimizing the problem that the task force needs to tackle, and the sensitivity curve will not be changed or touched.

Fiodor outlined the plan to collect additional ideas and proposals for configuration changes, then select the most promising options to study in more detail. This will involve preliminary design work to assess the impact on performance and civil infrastructure costs, with the goal of identifying a small number of viable options to explore further during in-person meetings.

**Actions:**

* The results that Sebastian Steinlechner presented will be shared (TDS) in a document by the end of January.
* Retain the discussion points/options out of those preliminary studies that are in principle at the same time possibly viable for sparing money on the civil infrastructure and likely safe enough not to spoil the performance (science).
* **Configuration brainstorm continued**

***15:00-15:30 CET***

**Point presented by:** Fiodor Sorrentino

**Point submitted for:** discussion

We are collecting several ideas on GitLab towards detector configurations with reduced impact on civil infrastructure requirements. Today we’ll summarize the options currently on the table, and we’ll briefly discuss what interesting combinations are possible to preselect viable options to be studied in more detail during in-person meetings.

**Summary of Discussion:**

The GitLab brainstorming topics were listed and summarised by Fiodor Sorrentino. The task force should go on with collecting suggestions and ideas for possible options for the configuration. Maybe this list is not comprehensive of things that have been already proposed or discussed, but the idea is to have a collection of those possible ideas that might be independent of geometry, or those who might depend on geometry.

* **Update and discussion on WBS**

***15:30-15:50 CET***

**Point presented by:** Fiodor Sorrentino

**Point submitted for:** information and discussion

During last week we had parallel discussions with expert groups to establish the work plan, in particular for preparatory activities to identify and analyze configuration options, as well as to establish a coherent requirements tree connecting design choices with the top-level performance requirements and to the impact on civil infrastructure costing. The WBS is being refined with respect to the time needed, the logical predecessors, and the people in charge for each task.

**Summary of Discussion:**

The work plan is being finalised in the form of a spreadsheet where we can identify individual tasks with basically the main target to align the timing of the different tasks that are interconnected. Fiodor Sorrentino confirmed the dates for the first in-person task force meeting, which will be held from February 18-20 in Pisa, and the second meeting in Amsterdam from March 18-20. The team will discuss the detailed organization of these meetings during the next virtual session.

* **A.O.B**

***15:50-16:00 CET***