Addendum to the MUonE experiment document

C. Matteuzzi, G. Venanzoni
on behalf of MUonE collaboration

1 Interested community

The present collaboration includes the following laboratories: INFN and Universita' di Bologna; INFN and Universita' di Milano-Bicocca; INFN and Universita' di Padova; Universita' di Parma; INFN and Universita' di Pavia; INFN and Universita' di Pisa; The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences, Krakow (Poland); Novosibirsk (Russia);
The following list includes groups which are interested in participating, but have not yet joined officially the activities: Liverpool, London (UK); Virginia (USA); Trieste (IT).

2 Tentative timeline

We are still exploring what tracking system based on Si technology, can perform the requested angular resolution needed for this measurement. Assuming that the most promising solution could come from the CMS technology optimized for the upgrade Phase-II of CMS, we would have the advantage that the procurement of the Si sensors could be made within the CMS contract, as well as the production of the readout electronics CBC3. We could profit also of the testing system of CMS. In this way we plan to have about 10 modules provided to us by CMS, for which we will request approval to run in 2021 at the M2 beam (already allocated for $\sim$90% of time to COMPASS).

For the full apparatus, tentatively we plan to upgrade the 10 modules running in 2021, adding whatever new planes will be available and run in the following years, from 2022 up to 2025 (LS3).

3 Construction and cost

The detector The detector will be built based on existing technical solutions. We try to profit from the upgrade activity of big experiments (CMS), or from starting experiments (mu3e). In the hypothesis that the technological solution we will adopt is existing, and will not need dedicated R&D, the cost can be contained. A preliminary estimate of the cost of the detector is within 10 MCHF, and can be reduced if we will procure the Si tracker within the LHC contracts.

The beam Within the Conventional Beam working group, in the frame of the PBC working group, it was established that the beam properties we request to run MUonE (space profile of few cm, essentially parallel along the full setup length, intensity of 10^7 muon/s) are available within the existing M2 beam, the required modifications being feasible within a budget well below 1 MCHF. We plan to operate the Beam Momentum Station of COMPASS, integrating it in our DAQ.

Computing requirements We plan to run in a triggerless mode. Preliminary considerations gives a flux of data of 0.5 Tb/s, which can be acquired with $\sim$10 servers. A farm will then handle and select the data.