

Letter of Intent

To: EGO Director - EGO Council Chair - Virgo Spokesperson

Date: May 9, 2025

From: Milano-Bicocca group c/o INFN & Università degli Studi di Milano-Bicocca, piazza della scienza 3, 20126 Milano, Dr. Stefano Della Torre, stefano.dellatorre@mib.infn.it

Subject: Expression of Interest to join VirgoLab

Dear Sir/Madam,

This letter serves as a formal expression of interest by Milano-Bicocca group (hereinafter referred to as "MiB") to join the VirgoLab, as described in VIR-1025B-24. We understand that VirgoLab operates, commissions, and upgrades the Virgo interferometer, and we are willing to contribute to its mission and to the achievement of its goals.

1. Introduction

MiB is a group constituted by researchers and technicians from both INFN MiB Section and University of Milano-Bicocca specializing in environmental noise analysis, pipeline development, data analysis and computing. Our expertise and ongoing research activities are highly relevant to the operation, commissioning, and potential upgrades of gravitational wave interferometers.

We believe that our participation in VirgoLab would be mutually beneficial, allowing us to contribute our knowledge and resources to the advancement of gravitational wave science in Europe and beyond, while also providing our members with valuable experience and opportunities within a leading international collaboration.

This letter outlines our main areas of interest and potential contributions to VirgoLab.

2. Scientific / Technological Case or Context of Opportunity

Our group has a background in the study and mitigation of environmental noise sources affecting gravitational wave detectors and the study of stochastic backgrounds. Our participation would primarily contribute to Detector Commissioning and Operations.

3. Description of the Proposed Contribution

Our proposed involvement in VirgoLab would encompass the following potential contributions:

- **Detector characterization:** Participating in the development and implementation of pipeline algorithms for the Detector Operations and Maintenance project, contributing to data quality characterization and potentially low-latency analysis. This would involve algorithm development, software implementation, and testing on Virgo data.
- **Instrumentation Support:** Contributing to the monitoring and mitigation of environmental noise within the Detector Commissioning project and relevant Technical Teams. This could involve developing on-site monitoring systems that include both software and hardware.

We are also open to contributing to other areas based on the evolving needs of VirgoLab and the expertise within our group. We are keen to engage with the existing VirgoLab Technical Teams and Projects to identify areas where our skills and resources can be most effectively utilized.

4. Costs, Calendar, and Resources

Initially, our contribution would primarily involve the effort of our existing personnel with 1 FTE.

We understand that the successful accomplishment of VirgoLab tasks, particularly the timely installation and commissioning of the O5 upgrade, will demand a strong and continual presence at the EGO site. Our group commits to supporting that effort as much as reasonably possible.

We anticipate the need for accessing detector data and support to travel to EGO.

We understand that Member Labs are in charge of maintaining and operating the equipment they provide, and we are prepared to discuss the provision of an acoustic sensor as part of a Memorandum of Agreement (MoA).

We are aware that financial resources are allocated by EGO Council, national funding agencies, or research organizations. We will explore potential funding opportunities through our institution and national agencies to support our involvement in VirgoLab.

We are prepared to work towards the establishment of a MoA with EGO should our application be successful.

5. Stakeholders and Requirements

Our primary stakeholders are INFN and University of Milano-Bicocca.

We understand that as a contributing group, our main requirements would be to have effective communication channels within VirgoLab, opportunities for our members to actively participate in relevant projects and technical teams, and recognition for our contributions to the scientific and technical advancements of Virgo.

We are committed to adhering to the policies and procedures of VirgoLab, including those related to resource allocation and publications.

We are ready to discuss our potential participation further and provide any additional information that may be required. We look forward to the possibility of joining the VirgoLab and contributing to its continued success.

Sincerely,

Stefano Della Torre, PhD On behalf of Milano-Bicocca

May 9, 2025

