

**Memorandum of Agreement between
the Virgo collaboration
and
INFN group of Sezione di Pisa**

April, 2015

The purpose of this agreement is to describe the participation of the Pisa group to the Virgo collaboration. The period covered by this Memorandum is two years from the approval date of the VSC.

1. CNRS and INFN signed an agreement concerning the realization of an antenna, Virgo, for the detection of gravitational waves on 27 June 1994 in Pisa. Virgo consists of a three kilometer Fabry-Perot interferometric antenna aimed at the detection of gravitational waves in the frequency range 4 -10000 Hz. The construction, exploitation and data analysis of the Virgo antenna is under the responsibility of the Virgo collaboration, which has been defined in its present form in December 2001. The Virgo collaboration is represented by its Spokesperson. The operation of the Virgo antenna is supervised by the EGO Council.
2. The expertise of the group concerns: seismic isolation system for the mirror suspension and its feedback control, the development of low noise control electronics, the interferometer global control and alignment, the vacuum and noise hunting with environmental monitoring. For data analysis the Pisa group is involved in the stochastic background and continuous wave search groups. The data analysis and long term R&D activities are carried on at INFN Pisa and at EGO site around the SAFE facility.

The past involvements of the Pisa group are described in the previous MoA.

In accordance with duties assumed for the Advanced Virgo Project, the group responsibilities are the following:

- Construction of a new Superattenuator for the support of a Signal Recycling mirror;
- Suspension up-grades of the three short SA (Mode Cleaner, Injection, Detection);
- Suspension up-grades of the 6 long SA including the last mechanical filter (Filter7) in accordance with the new payloads needs;
- Development and construction of the new control electronics and software for Superattenuators;
- Development and design of the new suspended Injection bench (SIB1);
- Development and design of the mechanical structure of the baffle to be installed inside the vacuum environment and on new payload for diffused light mitigation;
- Commissioning of the AdV interferometer;

- Maintenance of the SAFE facility at EGO site for feedback control development of new strategies (to be used in parallel with AdV commissioning);
- Maintenance and upgrades of the SAFE suspension system for R&D activities around the squeezed light project.

The group is contributing on data analysis subjects:

- *stochastic background* analysis where G. Cella is mainly involved;
- *periodic sources* for which a re-sampling method was developed (S. Braccini, A. Gennai and D. Passuello). On this subject a deep involvement of I. Ferrante and M. Razzano represent a crucial step forward in the scientific objectives achievements;
- *electromagnetic follow-up* unveiling the physics of compact objects with joint observations of GW and electromagnetic radiation (M. Razzano - FIRB 2012).

The current Pisa group composition is:

Names	FTE	Author	Student	Activity and thesis argument if any
Allocca Annalisa	100%	Yes	Yes	Injection+ Commissioning + squeezing
Basti Andrea	80%	Yes	No	SAT
Balestri Gabriele	100%	No	No	SAT
Boschi Valerio	100%	Yes	No	SAT - Commissioning
Bradaschia Carlo	40%	Yes	No	VAC and outreach
Cella Giancarlo	80%	Yes	No	DA – Stochastic and CW
Cerretani Giovanni	100%	Yes	Yes	SAT Commissioning
Di Lieto Alberto	40%	Yes	No	SAT
Di Virgilio Angela	40%	Yes	No	SAT
Ferrante Isidoro	70%	Yes	No	DA-CW
Fidecaro Francesco	100%	Yes	No	SAT DA-CW
Frasconi Franco	100%	Yes	No	Group leader, SAT, PAY, INJ DET Commissioning
Gennai Alberto	100%	Yes	No	SAT. DA-CW Commissioning
Giazotto Adalberto	40%	Yes	No	SAT
Gonzales Jose	100%	Yes	Yes	OSD PhD (Grawiton) Commissioning
Magazzu Carlo	100%	No	No	SAT
Moggi Andrea	70%	Yes	No	SAT
Passaquieti Roberto	100%	Yes	No	SAT – Commissioning
Passuello Diego	100%	Yes	No	SAT, Commissioning DA-CW
Patricelli Barbara	100%	Yes	No	DA-CW EM-follow up
Poggiani Rosa	40%	Yes	No	SAT
Razzano Massimiliano	100%	Yes	No	DA-CW and EM-follow up
Tonelli Mauro	40%	Yes	No	INJ

There are also two high level technicians (F. Paoletti and R. Cosci), having a permanent position at INFN Pisa, presently seconded to EGO Consortium. No feed-back for the group or at INFN Pisa is considered for their activities.


Remark: For a person who just joined the collaboration, the date in the author column is the date when the person will be added in the author list. This date is one year after the joining of the collaboration (except for student and postdocs who have defended their PhD less than two years ago, for whom there is no delay).

In the activity section the leading activity and the FTE are specified for each of the main categories: Advanced Virgo sub-system, Data Analysis (DA), Activities that cover several topics (like Commissioning) are put under Advanced Virgo operation.

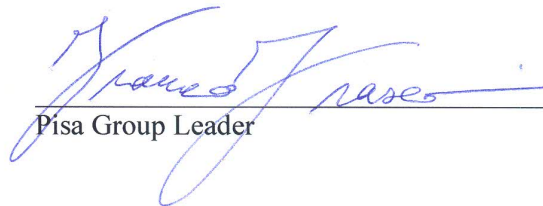
The FTE is computed on the research time.

The Pisa group leader will inform the collaboration of any change in the group composition and of any new thesis proposed.

Approved:



Virgo Collaboration Spokesperson



Pisa Group Leader

01/04/2015 _____
Date

01/04/2015 _____
Date