

**Memorandum of Agreement
between the Virgo collaboration
and the LKB Virgo group
for the participation to Virgo**

April, 2015

The purpose of this agreement is to describe the participation of the LKB 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 (GW) in the frequency range 10-10000 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. In Laboratoire Kastler Brossel (Paris), there is a wide and long-dating expertise of ENS, University and CNRS scientists on quantum optics, optomechanics and high-sensitivity measurements. The expertise comprises highly stabilized laser source design and operation, low noise electronics, operation of very high-finesse optical cavities, quantum-limited displacement detection and cryogenics. There are also a number of past and present collaborations with GW groups, such as Artemis, LMA, Australian National University (Canberra) or Un. Western Australia (Perth).
3. The LKB group proposes the following contributions to Virgo:
 - a) Parametric instability. LKB will contribute to the investigation of the occurrence of PI in Advanced Virgo, and to the optimal technical solution to damp them (contribution to ISC).
 - b) Quantum noises. LKB will investigate quantum noise reduction schemes in order to increase the sensitivity of Advanced Virgo, with the Squeezing Working Group. LKB will study the benefit of the squeezing technology and will evaluate its compatibility with AdVirgo design, in particular with the overall optical AdVirgo design (OSD), and with the detection system design (DET).
 - c) Implementation of a squeezing technology in AdVirgo. Participation to the construction and installation.
 - d) Participation to data taking shifts.

4. The current LKB group composition is:

Name	FTE	Position	Author	Main activity
Pierre-François Cohadon (U)	0.7	Associate Professor	yes	10%: group leader, Outreach, Squeezing WG co-chair Parametric Instability: 10% Squeezing: 50%
Antoine Heidmann	0.4	Laboratory director	yes	Squeezing : 40%
Tristan Briant (U)	0.4	Associate Professor	yes	Parametric Instability: 20% Squeezing: 20%
Thibaut Jacqmin (U)	0.4	Assistant Professor	yes	Parametric Instability: 30% Squeezing: 10%
Samuel Deléglise	0.4	Researcher	yes	Squeezing: 40%
Jean-Michel Isac	0.4	Research engineer Laboratory Technical director	yes	Mechanical Engineering Squeezing 30%, Technical support 10%
Sheon Chua	0.5	Post-doc	yes	Squeezing: 50%

Remarks:

- It is understood that for a person who joins the collaboration, the date which makes effective his/her authorship is one year after his/her joining of the collaboration (except for students and postdocs where there is no delay)
- In the activity section the leading activity and the FTE are specified for each of the four main categories: Virgo operations (V), Advanced Virgo (AdV) and Data Analysis (DA). Activities that cover several topics (like group leader) are put it under Virgo operation.

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

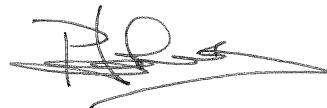
Approved:



Digitally signed by Fulvio Ricci
DN: cn=Fulvio Ricci, o=Università di
Roma La Sapienza, ou=Departmento di
Fisica, email=Fulvio.Ricci@uniroma1.it,
c=IT
Date: 2015.04.15 12:42:41 +0200

Virgo Collaboration Spokesperson

Date 01/04/2015



LKB Group Leader

Date 01/04/2015