

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

April, 2015

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

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 kilometre Fabry-Perot interferometric antenna aimed at the detection of gravitational waves 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. The Nikhef group has responsibility for the following hardware contributions to Advanced Virgo:
 - The design and construction of the angular alignment electronics for Virgo.
 - The design and construction of phase cameras.
 - The design and construction of the seismic attenuation system for the external injection bench (EIBSAS).
 - The design and construction of 5 seismic attenuation systems for optical tables operating in the minitowers (multiSAS).
 - The design and construction of four large cryotrap.
 - The design and construction of the IMC end-mirror payload.
 - The design and construction of the IMC dihedron.

The precise nature of these contributions has been defined over the last several years in collaboration with representatives of the groups involved in these activities, the detector coordinator and the spokesperson.

The Nikhef group can be expected to provide adequate support for the proper operation and maintenance of the devices under its responsibility.

3. The Nikhef group proposes the following contributions to the Virgo data analysis:
 - Participation in the analysis coalescence of compact sources for development of methods to realize model-independent tests of General Relativity (TIGER) and extraction of cosmological parameters. This activity of the Nikhef group is coordinated by C. Van Den Broeck.

- Participation in the periodic source searches analysis for development of methods to identify signals from binary pulsars. This activity of the Nikhef group is coordinated by H.J. Bulten.

The Nikhef group will provide adequate support for activities listed above that may fall under its responsibility.

4. The current Nikhef group composition is:

Name	FTE	Author	Student	Activity and thesis argument if any
Michalis Agathos	100%	Yes	Yes	CBC analysis
Kazuhiro Agatsuma	100%	Yes	No	Postdoc on phase cameras
Niels van Bakel	50%	Yes	No	Linear alignment Head of Nikhef's R&D department
Alessandro Bertolini	100%	Yes	No	Vibration attenuation Leader of Virgo's SBE group
Martin van Beuzekom	50%	Yes	No	Phase camera
Souman Koley	100%	Yes	Yes	Seismic, Newtonian noise, sensor studies
Jo van den Brand	100%	Yes	No	Group leader Cryotrap
Chris Van Den Broeck	100%	Yes	No	CBC analysis Physics Analysis Coordinator Virgo
Henk Jan Bulten	100%	Yes	No	CW analysis for binary pulsars
Joris van Heijningen	100%	Yes	Yes	Vibration isolation (multiSAS)
Reinier Jonker	100%	Yes	Yes	CW analysis for binary pulsars
Jeroen Meidam	100%	Yes	Yes	CBC analysis
Laura van der Schaaf	100%	Yes	Yes	Phase camera

Remarks:

- It is understood that for a person who just joined the collaboration, the date in the author column is one year after the joining of the collaboration (except for students and postdocs where there is no delay)

Two of the Nikhef group members (van Bakel and van Beuzekom) have at present responsibilities in LHC experiments, and for this reason their involvement is limited to 50%. The other Nikhef group members are fully dedicated to Virgo.

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

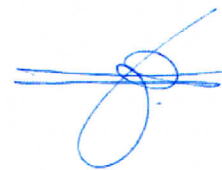
Approved:



VIRGO collaboration Spokesperson

01/04/2015

Date



Nikhef group Leader

01/04/2015

Date