

**Memorandum of Agreement
between the Virgo collaboration
and the Radboud University (Radboud) Astrophysics group
for the participation to Virgo**

April, 2015

The purpose of this agreement is to describe the participation of the Radboud 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 kilometre 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 operation of the VIRGO antenna is supervised by the EGO Council.
2. The Radboud group is an Astrophysics group, part of the Dutch national astronomy research school NOVA. Its main research areas are astroparticle physics, compact objects, binary evolution, accretion physics, stellar populations and galactic magnetic fields. The GW research is focused on direct detection of gravitational waves, the Electromagnetic (EM) follow-up of GW sources and their use to constrain the astrophysics of compact binaries. The efforts concentrate on
 - Development of joint EM-GW data analysis tools
 - Collection and interpretation of information from EM observations following GW triggers
 - Determination of background EM transients ("false positives" for counterparts to candidate GW detections) via their optical transient surveys.
 - Constrain astrophysical models with joint GW-EM data
 - Study on the future developments beyond Advanced Virgo.
3. The Radboud group will contribute to the Advanced Virgo observations and data analysis on:
 - The development of the infrastructure and software tools to send alerts to the astronomers, and to be part of the test alert campaign (EM follow-up group).
 - The development of the software to use the results of the EM follow-up partners to coordinate and optimise further follow-up via EM Bulletin Boards (EM follow-up).
 - Participation in the organisation of EM follow-up activities of the Virgo and LIGO Scientific collaborations (LVC) (EM follow-up).
 - Studies of systematics of waveform mismatches on sky localization and mass estimation (CBC)
 - Developing GW data analysis strategies that incorporate EM information within the framework of the LVC DA-EM efforts (CBC)
 - Development of optimisation of trigger strategies and feedback to GW DA of EM follow-up results (R&D)
 - Detector Characterisation.
 - Participation in LVC review committees, shifts and other tasks associated with membership of the collaboration.

The current Radboud group composition is:

Name	FTE	Author ⁽⁺⁾	Student	Activity and thesis argument if any
Gijs Nelemans (U)	50%	yes	no	<i>Joint GW-EM data analysis</i> 30% Management (VSC, EM follow-up), 20% DA (CBC, EM follow-up), Group leader
Paul Groot (U)	20%	no	no	<i>EM follow-up</i> 10% Management, 10% R&D (EM follow-up)
Shaon Ghosh	80%	yes	no	<i>Postdoc, GW data analysis, joint GW-EM data analysis</i> 40% DA (CBC, systematics, joint GW-EM), 30% DA (EM follow-up), 10% AdV (Det. char)
Samaya Nissanke	50%	yes	no	<i>Postdoc, EM follow-up</i> 50% DA (EM follow-up, bulletin board)
Steven Bloemen	20%	no	no	<i>Postdoc, EM follow-up</i> 20% DA (EM follow-up, bulletin board)

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 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 (AdV), data Analysis (DA), research and development (R&D), Management.
- The label (U) means: teaching duties. In that case, the FTE is computed on the research time.

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

⁽⁺⁾The author column is referred to the Virgo author list maintained by the Virgo Editor Board.

Approved :



Virgo Collaboration Spokesperson

Radboud Group Leader

Date 01/04/2015

Date 01/04/2015