



VIRGO COLLABORATION REPORT

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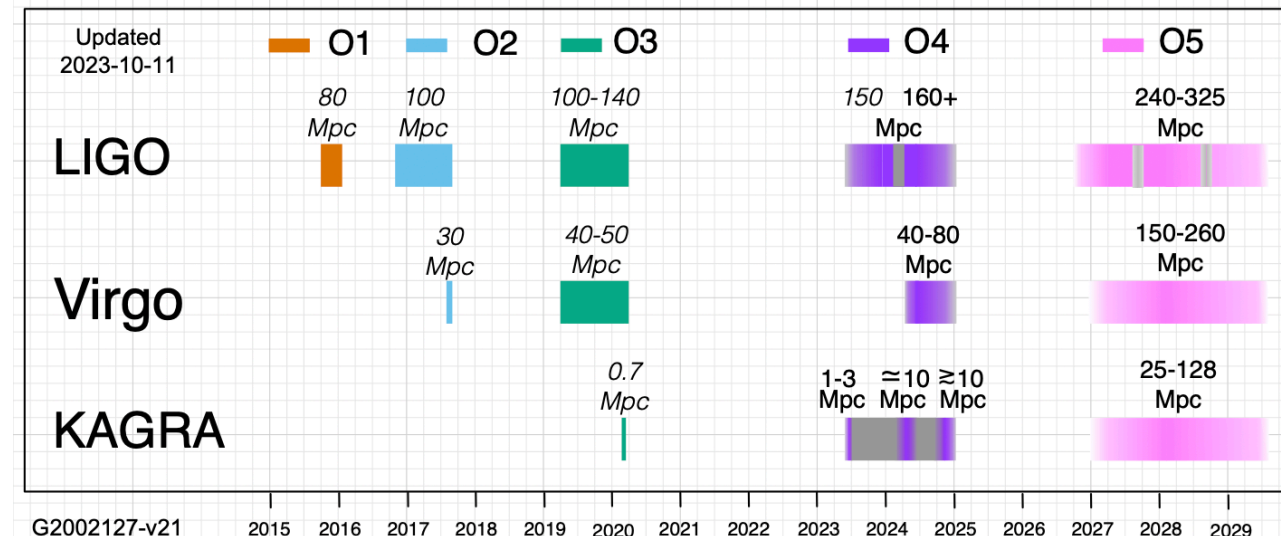
Virgo spokesperson

VIRGO JOINING 04

- Decision to join 04 “not later than March 2024 regardless of the sensitivity achieved,” taken by the VSC on Sept 27
- Boundary conditions:
 - LIGO plans for commissioning break
 - Kagra plans for joining (again) 04
 - EGO Council statement: *“March 2024 is the worst-case scenario, but we should aim for an earlier date”*
- Full assessment of status/preparatory activities from commissioning, data analysis, operations
- Disagreement in the VSC on the optical configuration:
 - commissioning coordinator proposal: more invasive actions, such as the removal of the Signal Recycling mirror, are not included in the plan and are not pursued, because they are too risky, are not compatible with the timeline and do not guarantee an improvement in sensitivity
 - on this last aspect, in particular the possible removal of the Signal Recycling mirror, some members of the VSC express discordant opinions
 - taking note of the disagreement within the VSC, the spokesperson takes responsibility for the decision, expressing full support towards the commissioning coordinator and the proposed commissioning plan

VIRGO JOINING O4

- The recent commissioning activities have allowed the Virgo detector to achieve a BNS range greater than 45 Mpc
- Focus will (in part) move to improving stability to optimize detector operation for science
- **More details in Fiodor's talk**
- Confirmed dates:
 - **Start of ER16: March 13, 2024**
 - **Start of O4b: March 27, 2024**
- Preparation for O4 is ongoing: no showstoppers



<https://observing.docs.ligo.org/plan/index.html>

Updated the O5 statement...: *"At the moment, Virgo is reconsidering its plans for O5 and both the date on which Virgo will be able to enter O5 and the target sensitivity are currently unclear. We expect to be able to define our plans for O5 around mid-2024."*

...and figure caption: *"For Virgo the graphics represents the initial plan established in 2019. This plan is being currently reconsidered (see text)."*

STABLE CAVITIES FOR O5

- Great work so far and excellent progress
- An "internal-short" option has been presented, which is interesting because it is potentially less expensive and can be implemented in a shorter time frame wrt the "external-long" option
 - An exact estimate of the time and cost required for the preparation of phase 2 requires the integration into the schedule of the other planned activities, which will only be possible after the preparation of the technical design
- Based on current studies, both appear to be viable options for the implementation of stable cavities in Virgo (**more details in Raffaele's talk**)
- **Neither option is risk-free: they need to be comprehensively assessed from the point of view of technological readiness, flexibility wrt future upgrades, time and cost**
 - Differential risk analysis to inform the decision (**more details in Alessio's talk**)
 - Internal review committee is being set-up
 - [Mandate](#)

STABLE CAVITIES FOR O5

- Different opinions in the VSC
 - immediately taking a decision in favor of the "internal-short" solution or, alternatively
 - proceed with the analysis of the risks associated with the two options and with the internal review, postponing the choice and the proposal to the EGO Council after the Virgo week in February
- Main motivation behind the proposal to choose the baseline configuration now is the need to complete the installation and commissioning of the stable cavities in time to join O5, currently scheduled from 2027 to 2029
- Other members of the VSC disagree with this approach, pointing out that the planning currently contains various elements of uncertainty
- Joining O5 in time to give a significant scientific contribution is a top-level objective
- It is also true that there are technical aspects, impacting on current project schedule, that require further investigation
- The work of the subsystem managers is still in progress
- The spokesperson decided to proceed with the risk assessment and asks the project management and the internal review committee to proceed in this direction, according to the proposed timeline
- Given the importance of the decision, it is necessary to take all the necessary time and not be driven by haste

STABLE CAVITIES FOR O5

- Path to reach a decision:
 - January 15: release by the project management of a document with the detailed risk assessment and proposal of a baseline configuration for stable cavities
 - January 31: release of the report from the review committee
 - February 5-8: Virgo week. Collaboration-wide discussion on the proposal of a baseline configuration and presentation of the report of the review committee
 - February 8: VSC meeting: final discussion on the proposal for the baseline solution

- After the decision, the preparation of the TDR and of an updated global plan for Phase II will start
 - Review of an external review committee

V_NEXT R&D PLAN

- Process to review the V_nEXT R&D plan ongoing
- The review of the R&D plan will continue as planned
 - Even if at the moment the configuration of the detector in the post-O5 phase is not entirely defined, the review activity is motivated by the need to pursue technological developments that will certainly be of interest for the future of Virgo and as enabling technologies for third-generation detectors (e.g. high-power operation, squeezing, coatings)
 - The review is organized to not interfere with the commissioning activity and with the preparation for O5
- We need to better clarify our long-term plans → global strategic plan to be prepared in 2024: strong coordination between O5 preparation and V_nEXT design
- **More details in Viviana's talk**

IMPACT OF WEATHER EVENTS

- Storm Ciaran hit Tuscany on November 2 – strong winds and heavy rain
 - Second full shutdown in six months
- UPS took over when power line went down but generators failed due to water contamination in fuel tanks
 - Triggered controlled shutdown of entire site
- No major damage, but detector recovery took ~3 weeks

- **Many thanks to all the people that reacted promptly to minimize the damage and to recover services as soon as possible**

- EGO infrastructure is 25-year-old and needs some extraordinary maintenance
- A common EGO/VIRGO procedure to react to these events is being defined



LIFE OF COLLABORATION

VIRGO COLLABORATION

➤ ~850 members, 586 authors, 149 institutions from 17 Countries

➤ 37 groups

- 36 full members (including EGO scientific group)
- 1 in the probatory period (CIEMAT Madrid)

➤ 9 Countries represented in the VSC

➤ Two groups expressed the intention of «dissolving»

- In one case, merging with an existing group
- In the other case, forming two new groups



ORGANIZATION: RECENT AND UPCOMING CHANGES

➤ Recently elected:

- Upgrade coordinator: Alessio Rocchi
 - The EGO Council has agreed that between now and the December meeting of the EGO Council there will be a period of overlap during which Alessio will join Raffaele Flaminio and Viviana Fafone in the preparation of the plan for the stable cavities to be presented to the Council in December. Subsequently, Alessio will take full responsibility for the next steps and the implementation of the plan
- Run coordinator: Nicolas Arnaud
- DetChar coordinator: Francesco Di Renzo
- LVK Joint Run Planning committee co-chair: Nicolas Arnaud
- Chair of the Virgo award committee: Fulvio Ricci
- Virgo representative in the LVK climate change committee: Archisman Ghosh
- Early Carrier Scientists representatives in the VSC in 2024 : Sophie Bini and Marion Pillas

➤ To be elected/appointed soon:

- Commissioning coordinator (will take over after we join O4 in March 2024)
- Core program committee chair and deputy chair
- Both elections in January

VIRGO GROUP MOA REVIEWS

- Procedure outlined in statute document [VIR-0454B-22](#) (Defining and reviewing the scientific contributions of Virgo groups)
- MoAs must be revised and reviewed every 2 years by default
- Review is done by MoA review committee
 - Ex-officio members, ~ assembly of coordinators
- Review based on current MoA, future MoA and past activity reports
- New MoAs prepared and reviewed in last quarter of year

MoA Review	Year N-1	Year N	MoA Review	Year N+1	Year N+2	MoA Review
	Current MoA (years N-1 and N)			Future MoA (years N+1 and N+2)		
	Year N-1 activity report	Year N activity report		Year N+1 activity report	Year N+2 activity report	

2023 MOA REVIEW

In **green** the groups that will be reviewed in 2023

France	Italy	The Netherlands	Spain	Other countries
APC	Firenze/Urbino	Maastricht	CIEMAT	AUTH (Greece)
Artemis	Genova	Nikhef	ICCUB-Barcelona	BelGrav (Belgium)
IJCLab	GSSI	Utrecht	IFAE-Barcelona	EGO
gMAG Lyon	Napoli	VU Amsterdam	IFT-Madrid	KU Leuven (Belgium)
Institut Fresnel	Padova/Trento		Valencia	POLGRAW (Poland)
IPHC	Perugia			RMKI Wigner (Hungary)
L2IT	Pisa			
LAPP	Prometeo/Jena			
LKB	Sannio/Salerno			
IP2I Lyon	Sapienza-Roma			
LUTH/Caen	Tor Vergata-Roma			

2023 MOA REVIEW

- Large and intense effort that involved a large part of the collaboration
- First round of meetings of the committee completed; the process will be completed before the end of the year
 - Comprehensive overview of the groups' activities and an opportunity for the groups to review their contribution to the collaboration
 - In general, positive impression: some minor adjustments required
 - **Few cases of more serious concern**
 - There will be further iterations and the process will be completed by the end of the year
 - Not a punitive intent, but a stimulus to improve
- We are working towards a convergence with the LIGO/LSC review process for next year

IGWN/LVK MOA RENEWAL

- Virgo members of the committee:
Gemme, Carpinelli, Marion, Carbognani, Freise, Martinez
- Upcoming Meetings
 - Online meeting 9 Jan 2023
 - F2F Meeting: 30 January - 1 February 2024, Amsterdam
 - Goal: sign the new MoA at the **Marck LVK meeting**
- Survey for LVK members to help guide our efforts
- Governing bodies: formalization of LVK management team composition, mandate, meeting schedule, agendas, minutes, etc
- Ongoing effort for improve integration of VK contribution in White Papers
- In general, tendency to progress towards a convergence of policies among LVK (membership, authorship, P&P, ...)
 - But specificities of individual collaborations have to be recognized and respected

COMMON FUNDS – ADV+ PHASE 2

- In 2021 the Council asked the Virgo Collaboration to contribute to the budget needed for AdV+ Phase II → they must be direct or indirect contributions to phase II budget
 - The contribution must be shared among the groups which are not involved in EGO through their reference funding agencies
- The contribution scheme was based on two main figures:
 - The Phase II budget: 13.86 ME
 - The fraction of authors in the groups (excluding PhD students), ~11% of the total at that time
- The contribution per author per year was established at **6.5 k€/year/author**
 - Based on the total cost of Phase 2 (13.8 M€) and the fraction of non-EGO authors
- **The contribution can be provided both in cash, in kind or by a combination of the two**

COMMON FUNDS – M&O

- **Starting from 2023 financial participation to the M&O of the Virgo detector is mandatory to retain Virgo authorship status** (VIR-0383A-23, EGO_DIR_61_2023)
 - Financial obligations are determined for each calendar year based on the official VMD
- **Non-EGO Members**
 - Institutions that are not EGO Members have financial obligations proportionate to the Institution members that qualify as Virgo authors
 - **The contribution for non-EGO Members is set at 8 k€/year/author, excluding Master Degree and PhD student**
 - This contribution is fixed for three years and will be redefined in 2026
 - **The contribution has to be paid preferentially in cash, unless an in-kind contribution valuable to EGO could be identified** and approved by the EGO Director after consultation with the Virgo spokesperson
- The two decisions for common funds generated some confusion and some clarification would be useful: **are these two separate contributions requested to the groups or the second superseeds the first?**
- In any case, the contribution due for AdV+ phase 2 will be re-evaluated including the additional cost of stable cavities and considering contributions (cash and in-kind) already committed by groups