

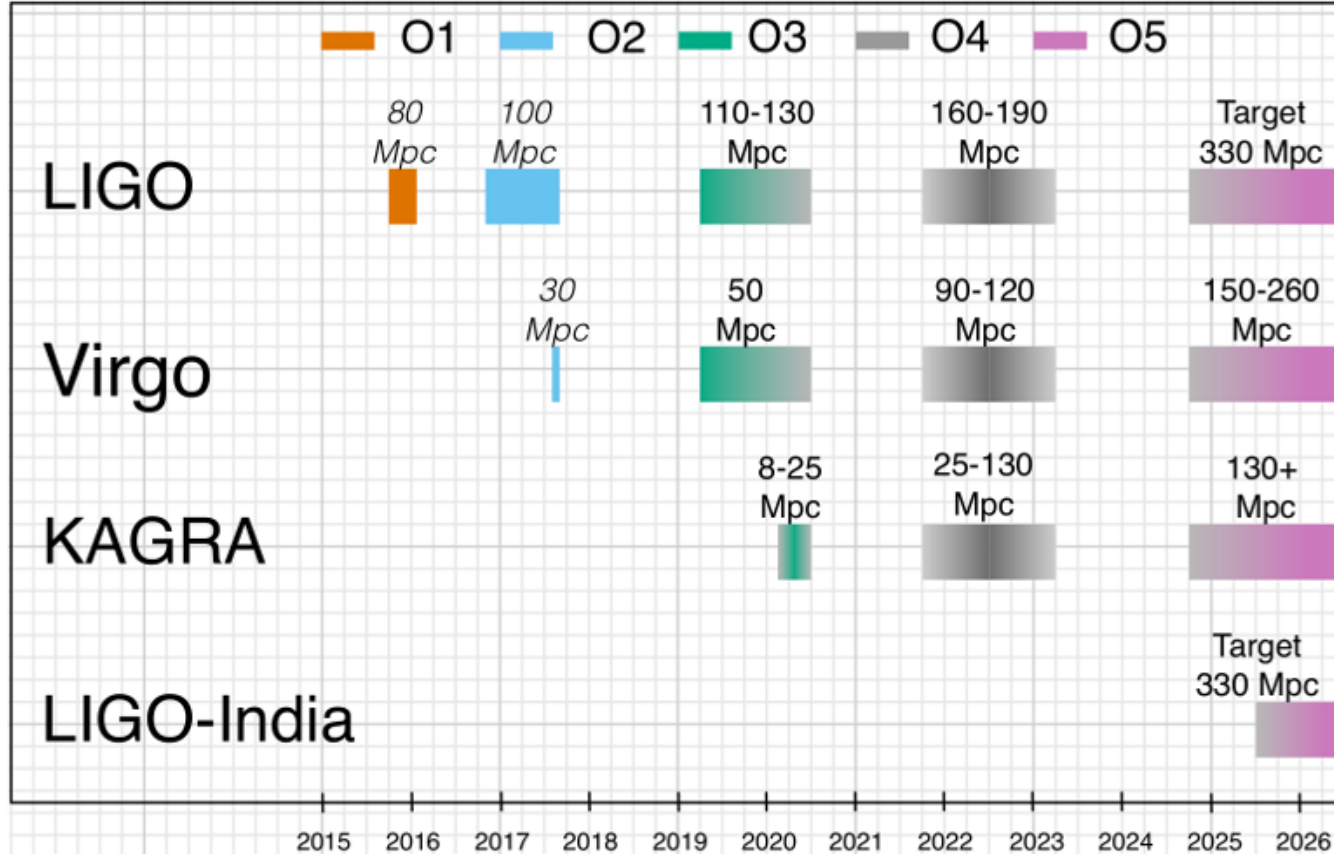
Advanced Virgo+

Eric Chassande-Mottin

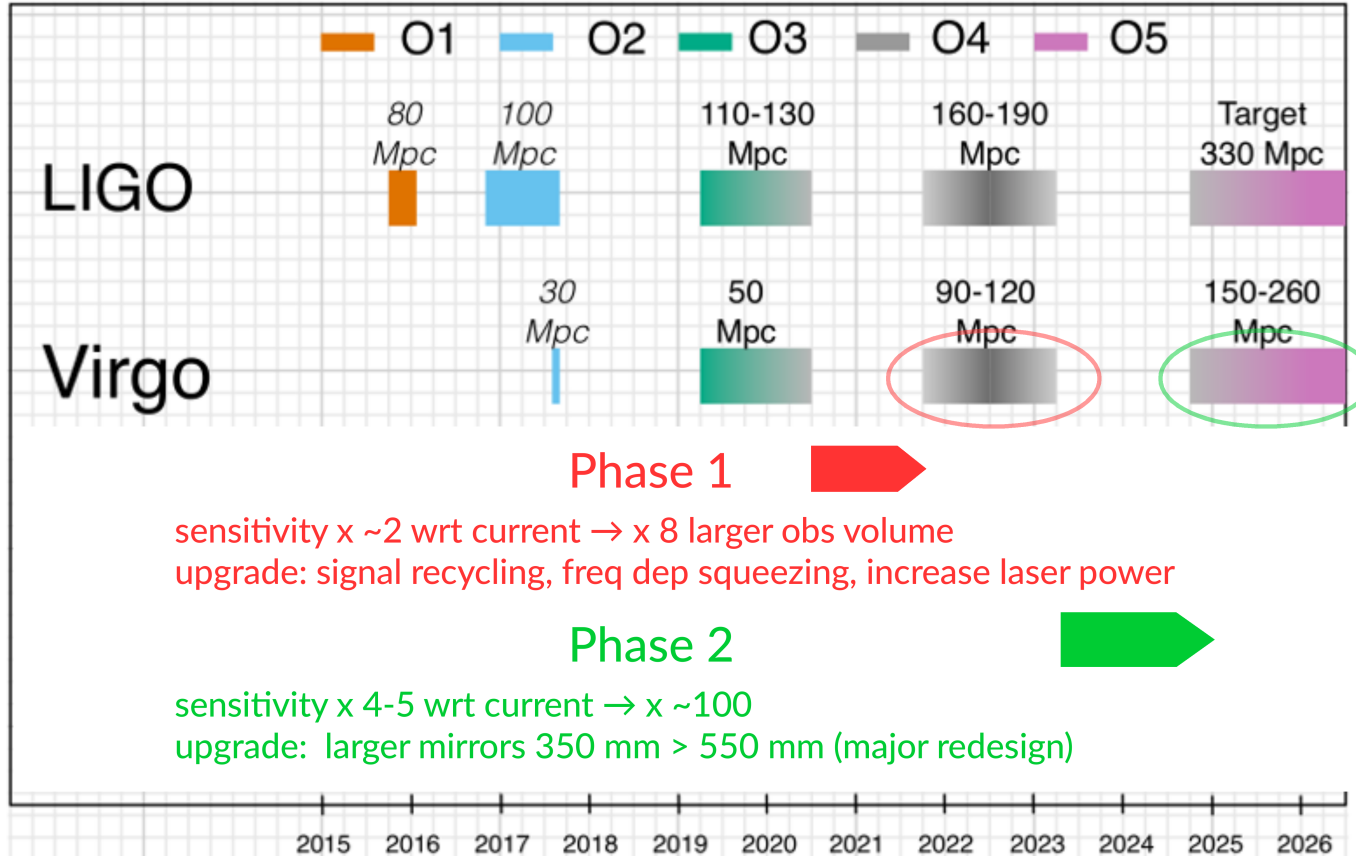
AstroParticule et Cosmologie (APC)

CNRS Université de Paris

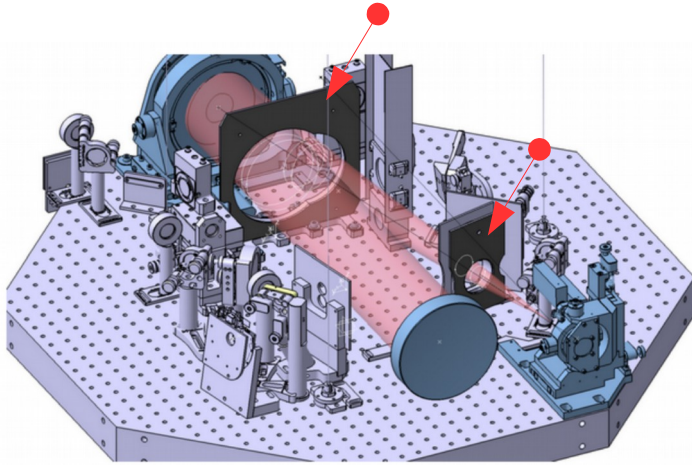
Advanced Virgo+



Advanced Virgo+ : two major upgrades



AdV+ phase 1



- Phase 1 approved & funded by CNRS/INFN

- Budget ~6.5 M€

- Timeline

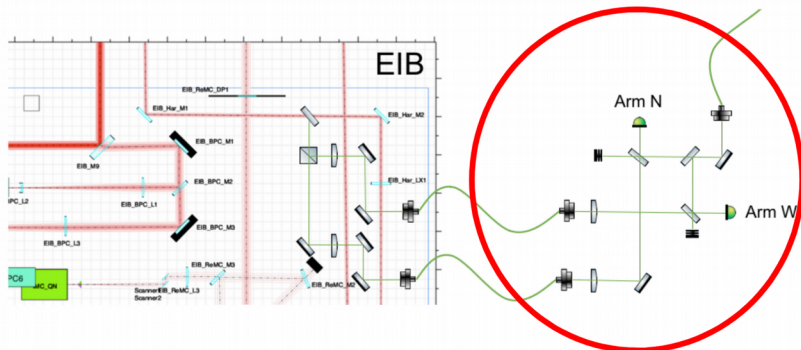
- Jul 2019-Apr 2020: design/building parts
 - Apr 2020-Q4 2021: installation/commissioning
 - Likely plan revision after Covid-19 epidemy

- Two construction contributions

In continuity with former responsibilities

(mode-matching telescopes built by the lab)

- Diaphragms on detection telescopes
 - For *stray light* mitigation
 - Difficult design (busy opt bench, mechanical constraints)
- Wide-band (170 MHz) photodiodes & read-out electr.
 - Key component of new locking scheme using aux laser



AdV+ phase 1 (cont'd)

- Other future [hardware] contributions
 - Frequency dependent squeezing

A frequency dependent squeezed vacuum source for broadband quantum noise reduction in advanced gravitational-wave detectors

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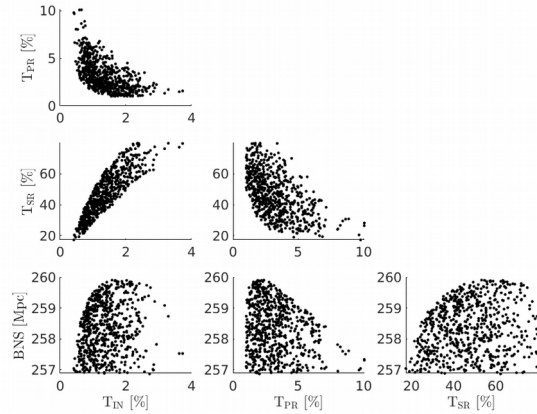
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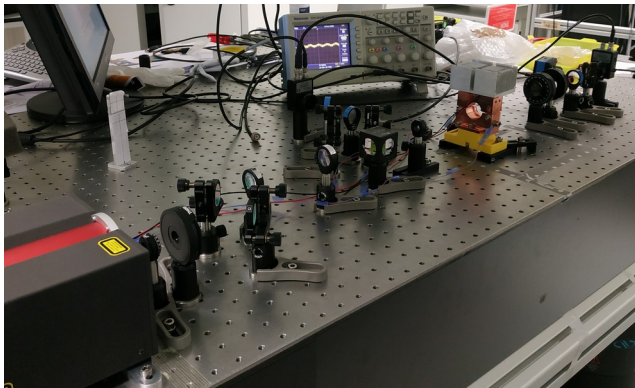
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AdV+ phase 2

Optimization of mirror transmissions
Largest range to binary neutron stars



Test bench for the EPR etalon



- **Budget ~14 M€**
 - Dominated by **large mirror** purchase and production
 - Decision expected in 2020
- **Timeline**
 - Installation post 2023–2025
- **Participation to optical design and R&D**
 - **Redesign** of the opt. scheme to include large mirrors
 - Contribution to **quantum non-demolition experiment**
- **Options for hardware contributions**
 - Redesign mode-matching telescopes (larger beams)?
 - Need an optical engineer