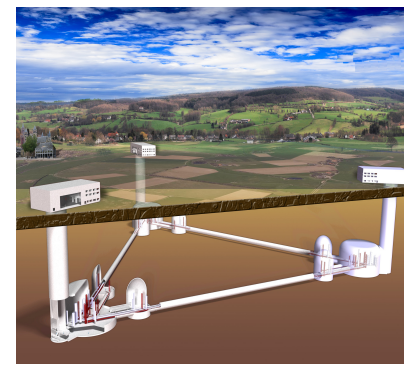


GW detectors and related institutions

- **Einstein Telescope** (3rd generation detector)
 - ✓ FP7 design study (2011).
 - ASPERA roadmap. Candidate ESFRI
- **Advanced Virgo “pathfinder”** (2nd generation)
- **European Gravitational Observatory, EGO**
 - CNRS-INFN consortium with other partners
 - Manages Virgo site (Italy) and hosts ET coordination

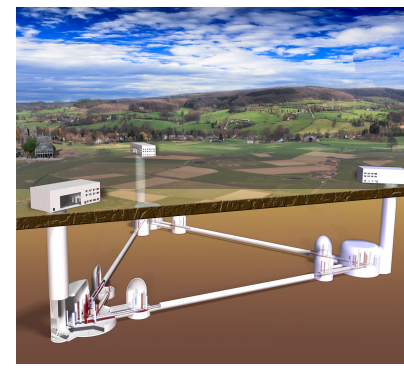
Astéris



Status of Advanced Virgo

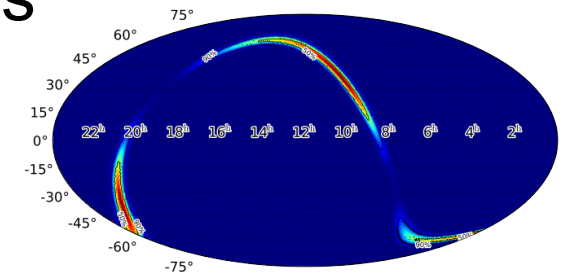
- Currently upgrading: **x 10 sensitivity improvement** over 1st generation (2007-12) → x 1000 in the event rate
 - ✓ Observability horizon for binary neutron stars : 140 Mpc
 - ✓ Current BNS event rate estimates: few to tenth events/yr
- **Plan: First science data in 2016** jointly with US based LIGO
- Opportunities for **multimessenger astrophysics**
 - ✓ Search for electromagnetic counterpart (i.e., GRB afterglow, flaring object, kilonova, ...)
 - ✓ Extensive **electromagnetic follow-up program** including LOFAR, HESS, CTA, ...
 - ✓ Interoperability between observatories being laid out

Astérics

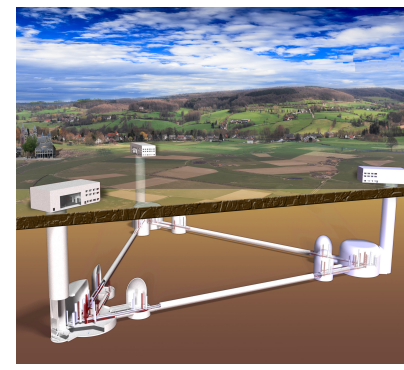


GW related-challenges

- Low-latency analysis of **distant** detectors
 - ✓ Should allow background rejection – “glitches”
- Alert generation within **minutes**
 - To allow the observation of prompt emission and short afterglows
- GW error is **large** by astronomical standards
 - ✓ Few 100 sq degrees – Needle in the haystack: many galaxies and many potential unrelated transient sources
 - ✓ Prioritize regions to follow-up



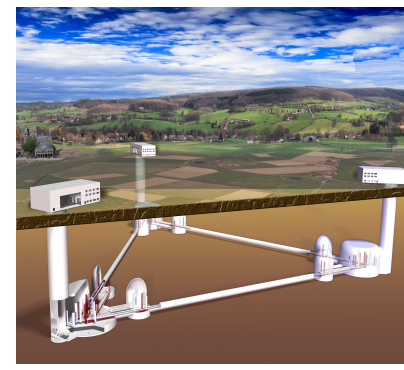
Astérics



Multimessenger astrophysics with GWs

- Connection with ASTERICS topics and WPs
 - ✓ **Low-latency alert generation** from GW data (WP5)
 - ✓ Optimization of **follow-up strategy** (in large GW error box)
 - Cross-correlation with catalogs of nearby galaxies (WP4)
 - ✓ **Cross-matching** with other astronomical transients (WP3 & WP4)
 - Rejection of unrelated transients (variable stars, AGN, ...)
 - ✓ Robust assessment for **coincidence significance** (WP3)
- Expectations from ASTERICS
 - ✓ Expertise and knowledge sharing (Virtual observatory, other ESFRI)
 - ✓ New contributors

Astérics



GW observations and the VO

- Access model for GW data in the next decade
 - Assessing GW event significance is difficult. This is the reason with **we operate currently under a close-data model**
 - However, we have a **plan for public release**
 - After first 4 alerts, <https://dcc.ligo.org/LIGO-M1300550>
 - LIGO open science center, <https://losc.ligo.org>
- Expectation for ASTERICS
 - **Prepare/support future public release** to the VO