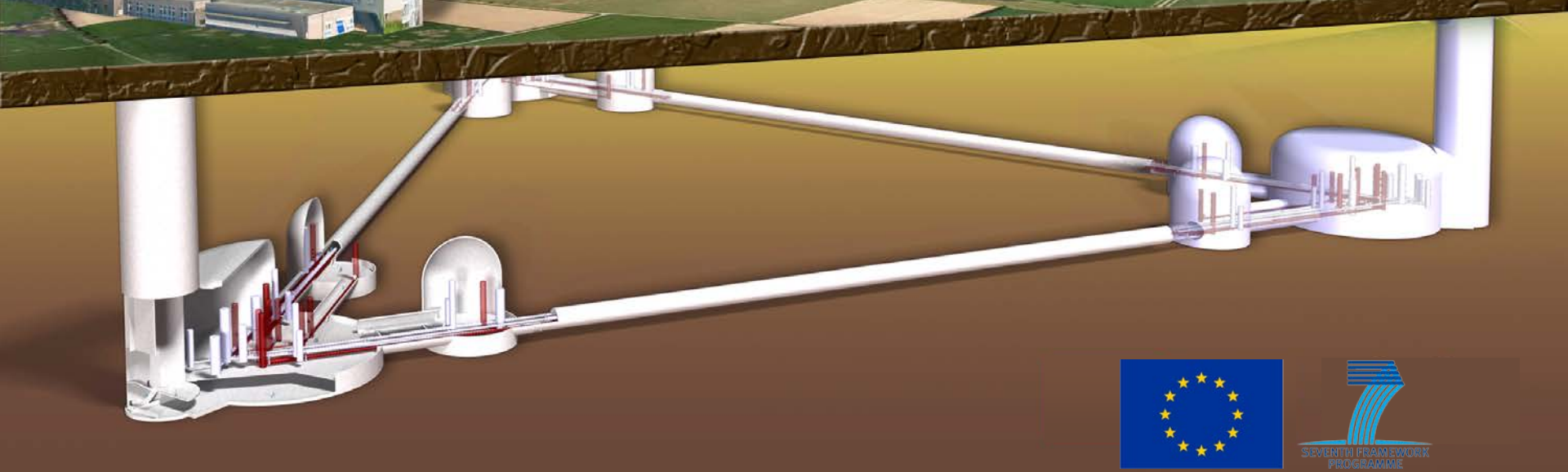




ET\_ITALIA



# THE EINSTEIN TELESCOPE

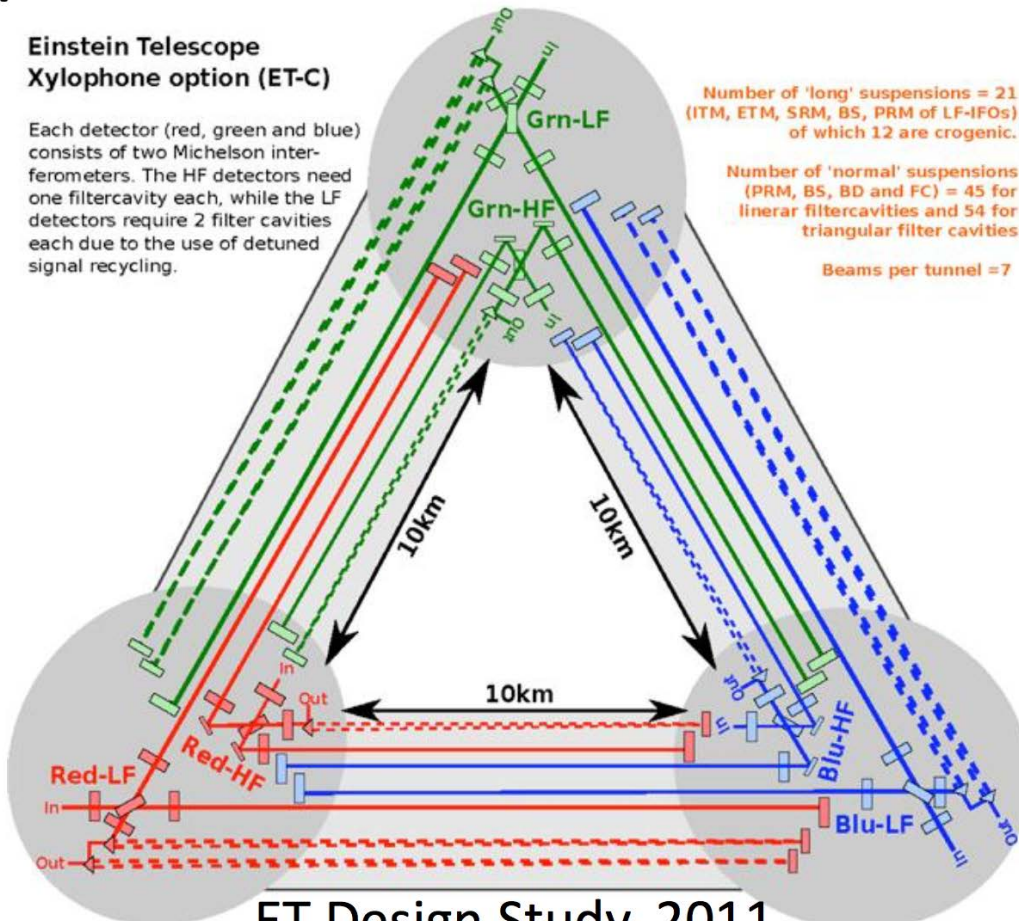
## Einstein Telescope Xylophone option (ET-C)

Each detector (red, green and blue) consists of two Michelson interferometers. The HF detectors need one filtercavity each, while the LF detectors require 2 filter cavities each due to the use of detuned signal recycling.

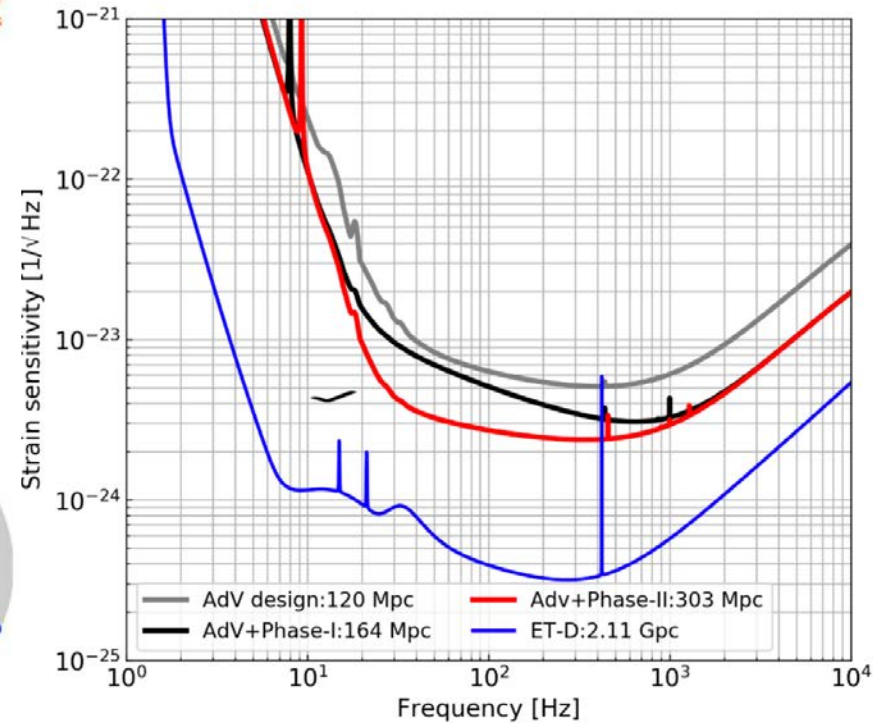
Number of 'long' suspensions = 21  
(ITM, ETM, SRM, BS, PRM of LF-IFOs)  
of which 12 are crogenic.

Number of 'normal' suspensions  
(PRM, BS, BD and FC) = 45 for  
linear filtercavities and 54 for  
triangular filter cavities

Beams per tunnel = 7

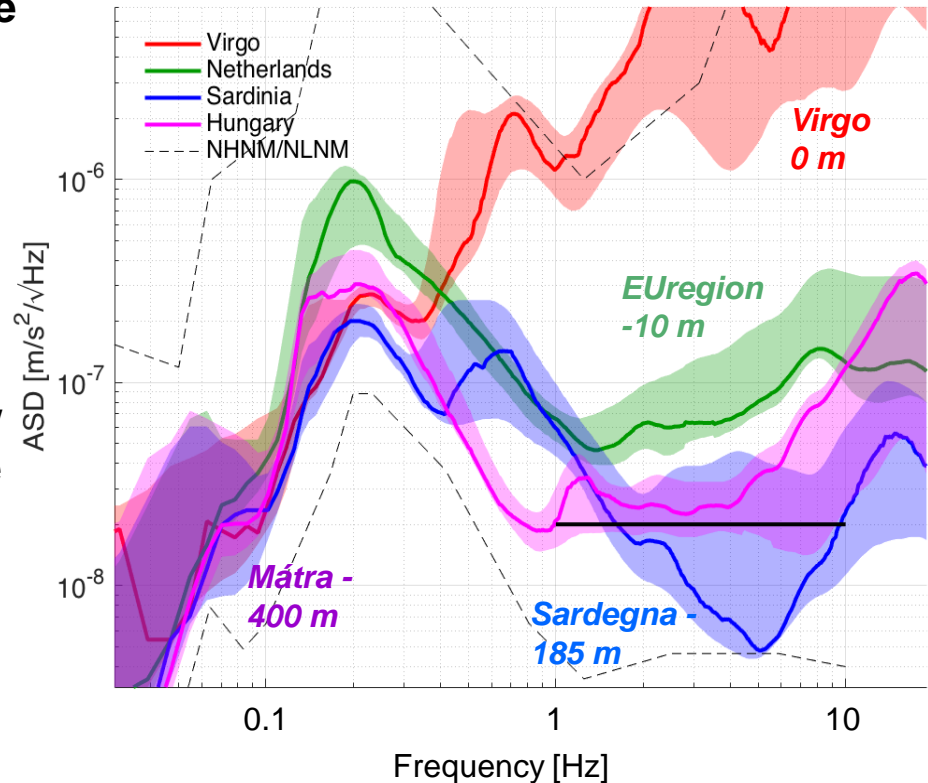


ET Design Study, 2011



# FROM THE CONCEPT TO A REALISTIC IMPLEMENTATION

- ✓ Identify requirements for the infrastructure
- ✓ Put it in a realistic context (candidate sites)
- ✓ Do a preliminary feasibility study and costing
- ✓ Develop crucial technologies:
  - improvement of the VIRGO **seismic attenuation system**, to improve the low frequency sensitivity and to maintain the INFN historic leadership in this field
  - design, construction and test of a **cryogenic payload**
  - development of innovative **frequency dependent squeezing** techniques, to reduce quantum noise;
  - improvement of the (optical and mechanical) losses of the **mirrors' coatings**, to reduce thermal noise



# APPEC STRATEGY 2017-2026

With its global partners and in consultation with the Gravitational Wave International Committee (GWIC), APPEC will define timelines for upgrades of existing as well as next generation ground-based interferometers

APPEC strongly supports further actions strengthening the collaboration between gravitational-wave laboratories

**It also strongly supports Europe's next-generation ground based interferometer, the Einstein Telescope (ET) project, in developing the required technology and acquiring ESFRI status**

In the field of space-based interferometry, APPEC strongly supports the European LISA proposal

Proposals for the next update the ESFRI roadmap (2020) must be ready to be submitted in **August 2019**

Having considered:

The excellent geological, geophysical and anthropic features of the Sos Enattos mine in Sardinia (where the SarGrav lab will be hosted thanks to the support of Regione Sardegna and UniSS)

The support of the Italian government, the Regione Sardegna, the INFN, the University of Sassari

## **WE PROPOSE THE SOS ENATTOS AREA AS A CANDIDATE SITE FOR THE REALIZATION OF THE ET INFRASTRUCTURE**

The candidature must be prepared with

- a detailed geological, seismic and environmental characterization of the Sos Enattos site (already started with the contribution of INFN, EGO, UniSS and SWS)
- A coordinated *political* and communication action towards all the relevant stakeholders

- Frequency dependent squeezing (EPR)
- Newtonian noise mitigation
- R&D on mirror coatings @ low temp
- Vacuum and cryogenics
  
- Strong support to the candidate site in Sardinina (Sos Enattos mine)

# ANAGRAFICA E SERVIZI

## RICERCATORI

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Cirone Alessio	PhD	0,4
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Gemme Gianluca	Primo Ricercatore	0,4
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<b>TOTALE</b>		<b>0,8</b>
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