

Amaldi Research Center, eredità e sguardo al future.



SAPIENZA
UNIVERSITÀ DI ROMA

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Sapienza univ Roma & INFN Roma

Presentazione ARC al dipartimento

9 dicembre 2021

What the ARC is leaving to our community

- **Infrastructures**

- New labs with new apparatus

- **Connections** between different fields.

- Quantum tech, condensed matter, material science, GW interferometer,...

- Theory and experiment **talking each other**

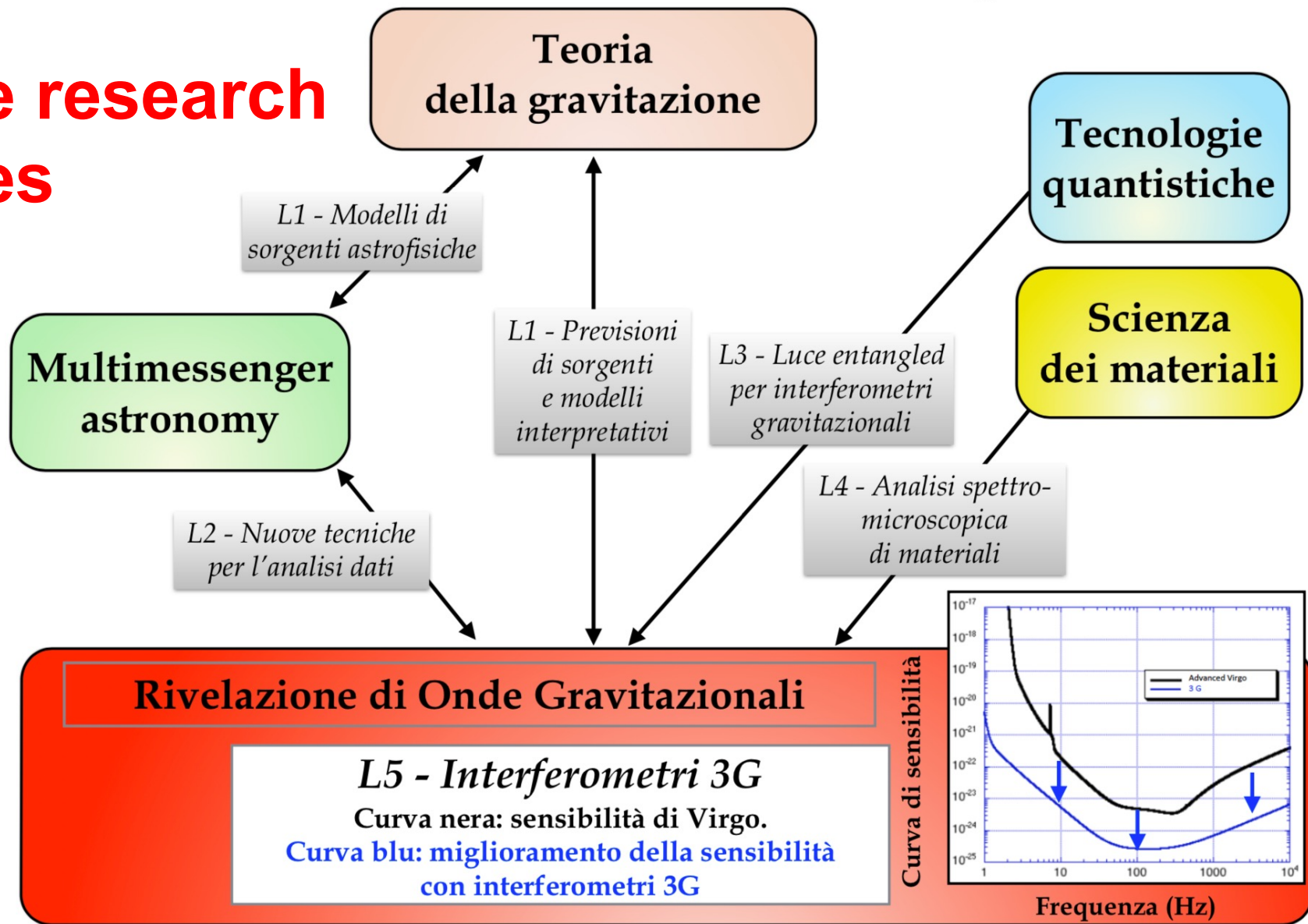
- Theorists and experimental confronting, new ideas for data analysis

- Different experiments talking each other

- **The multi-messenger approach** (GW interferometer, optical telescopes, X-ray satellites, ...)

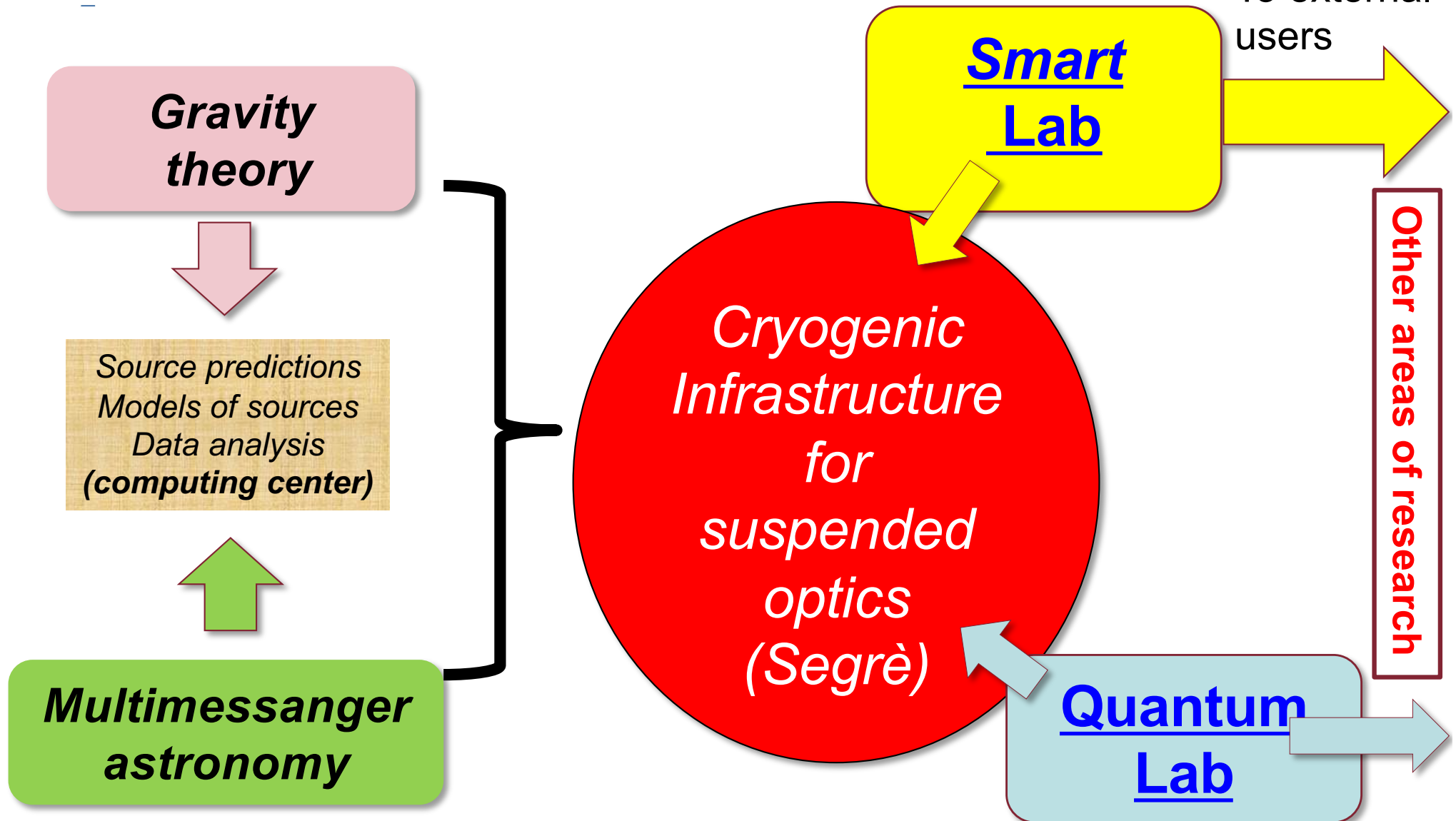
The Amaldi research center project

Five research lines



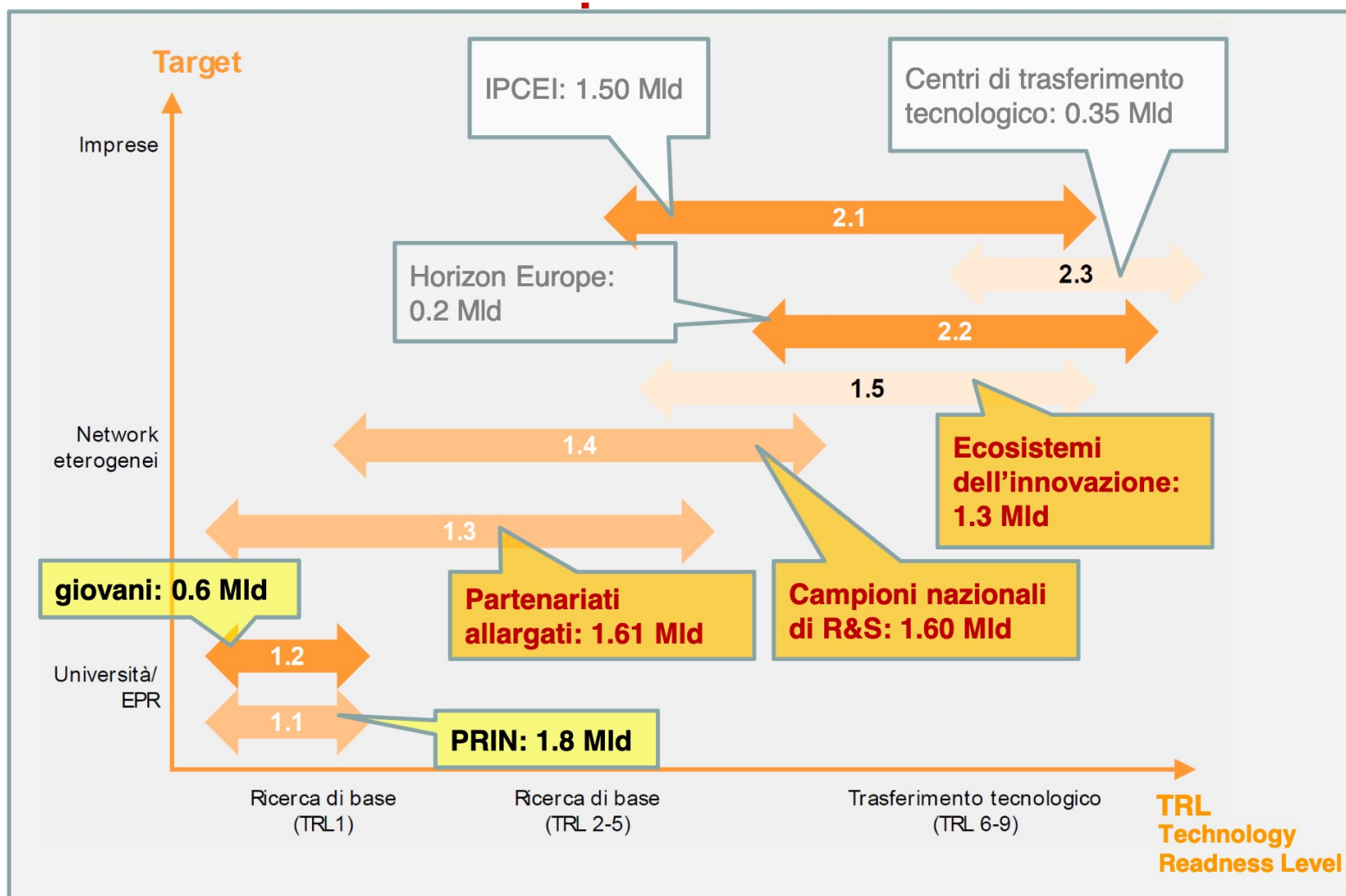
Where we are now

- To our Dep.
- To external users



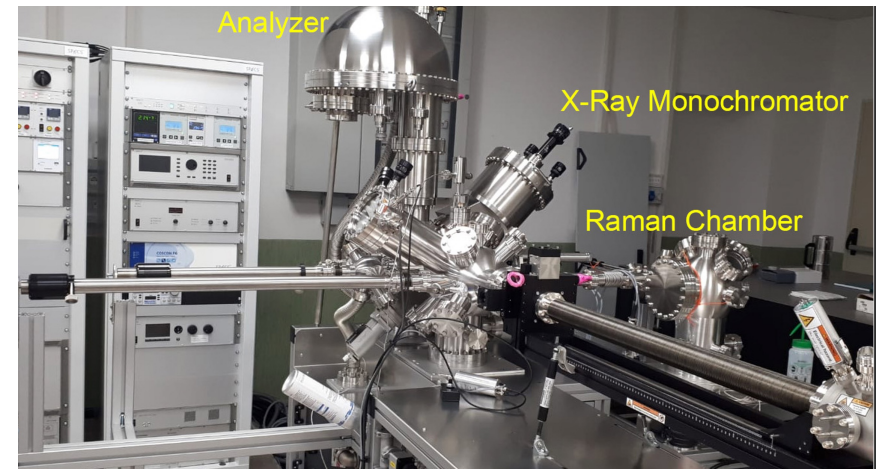
Near future, the PNRR (Missone 4 C2)

[S.Sarto at Conferenza di ateneo](#)



Micro-spectroscopy lab (SMART lab)

- A brand new apparatus, in Ultra High Vacuum with micro-metric resolution
 - Raman, photoluminescence, X-ray photoelectron spectroscopy **together**
- A three year long effort, lead by MG.Betti and a preparatory group.
 - Now operational.
 - Tech. support guaranteed by **M.Sbroscia**.
- Open to all the groups in our department.
 - To be opened to external collaborators and to external (to the dep.) users

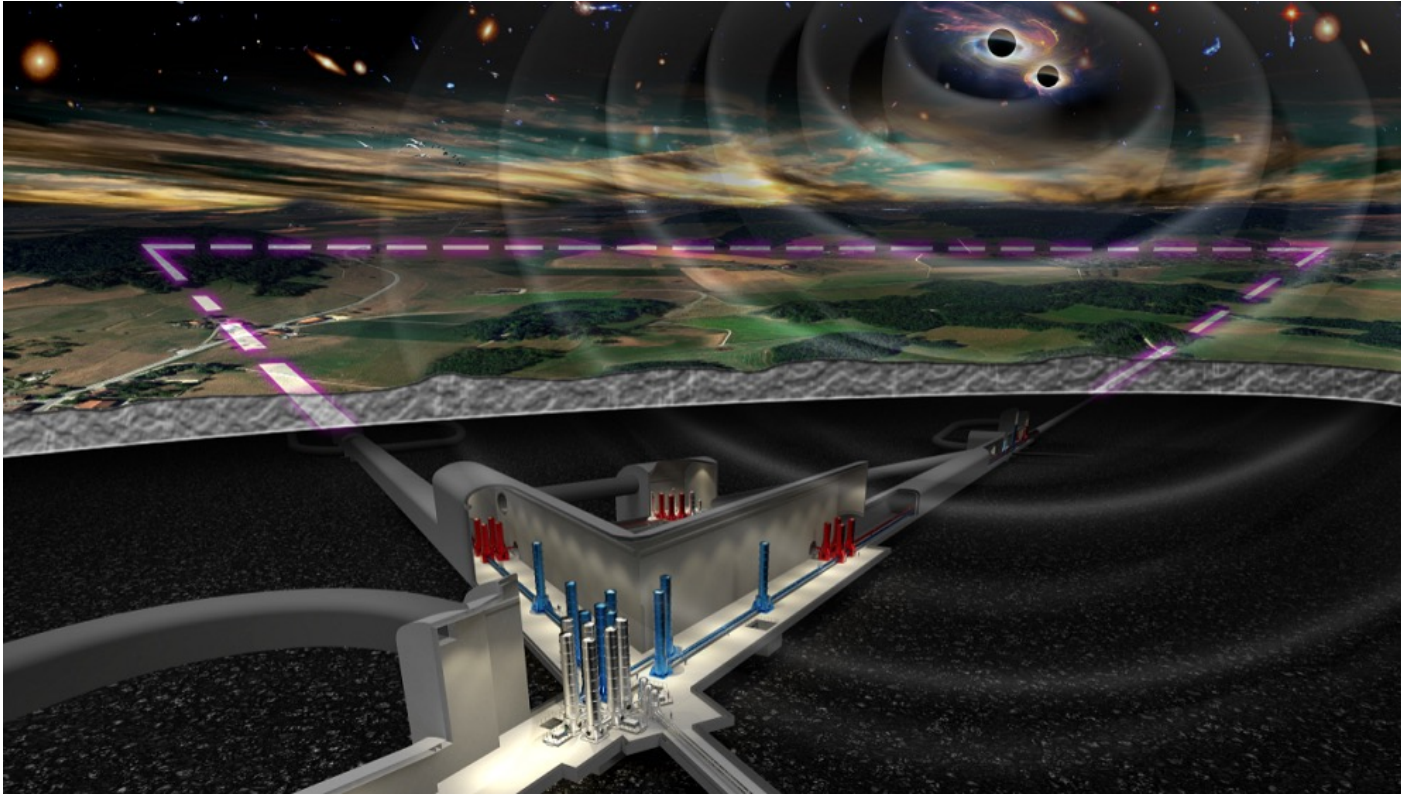


Include it in a network of infrastructures ([SRI?](#) [IARI?](#))

PNRR resources
(«EXTENDED PARTNERSHIP»)

The future interferometer for GW

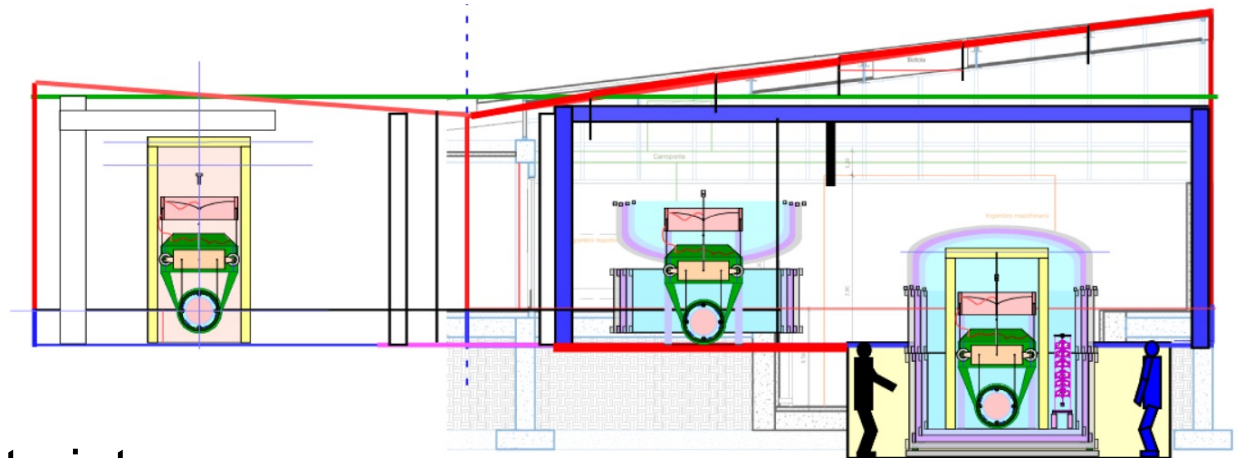
- The [Einstein telescope](#) project



Einstein telescope R&D lab

- Study cryogenic mirrors for ET.
- In a refurbished building (Segrè)
 - Not yet there, but close
 - Civil infrastructure upgrades are a real challenge, extremely long time, dictated by external constraints.

First operation in mid 2022

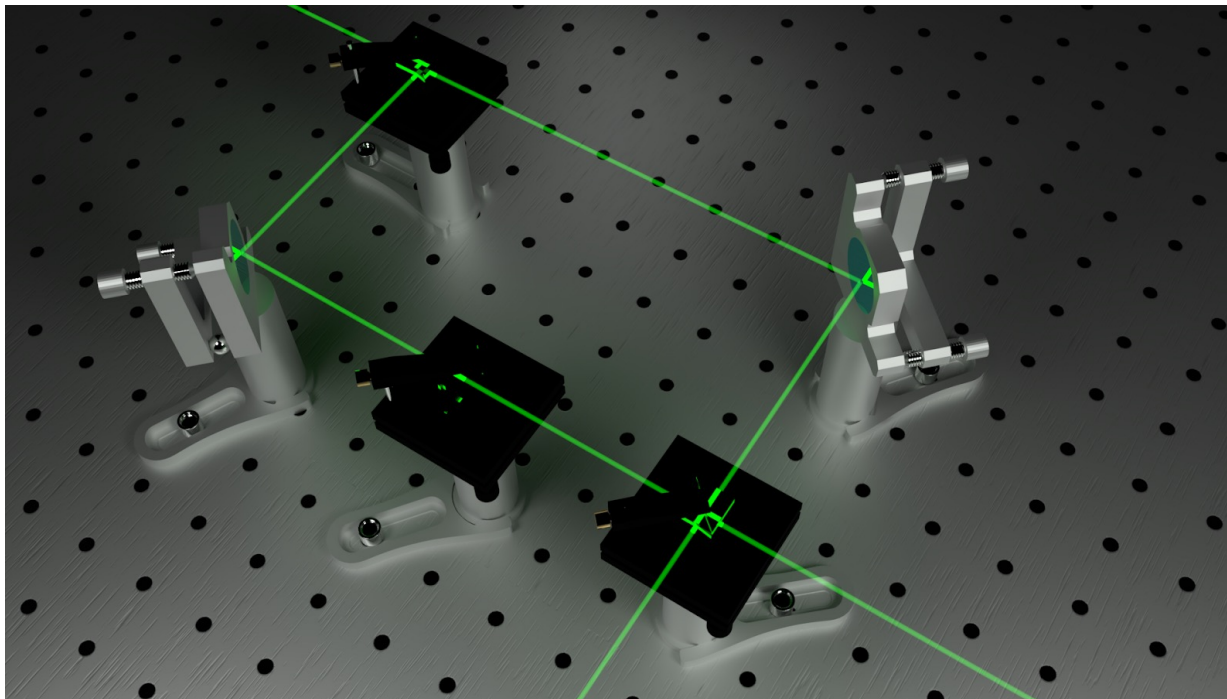


- Again PNRR can help in developing it
 - **INFN leading a network of infrastructures for the ET R&D programs.** Sapienza could join this network
 - New spaces needed (Sapienza?)

P.Rapagnani, F.Ricci, now E.Majorana

Quantum tech. for GW

- Developed technique of quantum sensors at Quantum Lab (optical phase estimate)
- Also with the aid of Machine learning techniques



In the process
of building a light
squeezer (2022)

F.Sciarrino, N.Spagnolo

Infrastructure: Legacy to the department

- **Large investment** (>2.5M euros)
 - L1 (0.1) L2 (0.1), L3 (0.3),L4 (1.4), L5 (0.75)
 - Need to be exploited at best in the next coming years.
- Several groups motivated to work in the labs.
 - **Extend** the physics goals beyond 3G GW interferometers ?
- However, **medium term sustainability** is an issue
 - Operation requires funding for metabolism
 - New developments require to apply to new calls (form collaborations)
 - Long term sustainability must be guaranteed by technical support

ARC and students

- 2 + 2 prizes for master and Ph.D. thesis.
 - https://www.phys.uniroma1.it/fisica/arc_awards
- Restricted to the five ARC lines of research
- **Legacy**: Is the department willing to create a master thesis prize to be awarded every year ?
- Very Important for our (best) students.

Fostering connections

- **Legacy** : organize every year a *Christmas poster exhibition* for our students, postdoc, researchers
 - A way to disseminate among us the research activity.
 - Connected to PhD schools (Physics, Astrophysics, Accelerator physics, etc.)

**Today you are invited to drink a coffee
and take a look at the poster here
at first floor**

- **Legacy** : consolidate the **ARC PhD school** in future

ARC fellows

- Post-docs with good salary.
- Resources
 - https://www.phys.uniroma1.it/fisica/arc_fellows



- **Legacy:** create a high profile post-doc position to be awarded for 2+1 year.

What we have still to do

- By Mar 2022 we will have to write a report to MUR.
 - Critical to get access to **next call** of Dipartimenti di Eccellenza (in 2022!)
- By the end of 2022 we have **to put in operation** all the infrastructures.
- Possibly write a **joint physics report** of this experience

***For the future:
A group of young and motivated people
should take over***

The impact (we would have liked to have)

