

ET

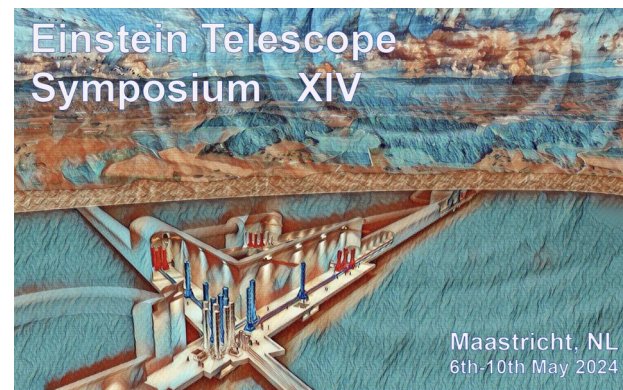
EINSTEIN
TELESCOPE

Einstein Telescope Observational Science Board (OSB)

Marica Branchesi, Archisman Ghosh, Michele Maggiore
ET Monthly Meeting, July 2, 2024

Largely based on:

(courtesy: M. Branchesi)



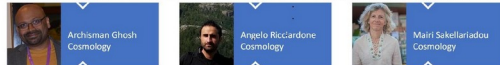
The Observational Science Board: structure and goals

OSB chairs

DIV 1: Fundamental Physics



DIV2: Cosmology



DIV3: Population Studies



DIV4: Multimessenger Observations



DIV5: Synergies with GW detectors



DIV6: Nuclear Physics



DIV 7: Stellar Collapse and isolated NS



DIV8: Waveforms



DIV9: Common Tools



DIV10: Data Analysis MDC



OSB MANDATE

to develop the Einstein Telescope science case, build the ET scientific community, and bring it to the maturity to exploit the ET observations

Goals

- to help instrument technical development and implementation (CoBA); ✓
- to update the science case (Blue Book); ✓
- to involve cosmologists, nuclear physicists, high-energy physicists, astronomers and astrophysicists; ✓
- to build the synergy, collaboration and coordination with other gravitational-wave, electromagnetic, neutrino observatories (for example THESEUS and WST); ✓
- develop the data analysis and computing infrastructures (first MDC). ✓

Blue-Book

Goals and Target

- will be **the reference ET book for the scientific community** describing the science achievable with ET;
- **it will update and enlarge the scientific cases** including published and original works, and covering several assumptions and models to provide a global overview of the science;
- the target readers are scientists;
- taking into account that ET science covers a wide range of topics involving different scientific communities, while containing some technical details it will be written to be accessible to everyone;
- it will be published in a journal.

Structure

it is built around the OSB division structure, each division will produce a chapter:
DIV1 - Fundamental Physics, DIV2 – Cosmology, DIV3 - Population Studies,
DIV4 Multimessenger Observations, DIV5 - Synergies with other GW Observatories,
DIV6 - Nuclear Physics, DIV7 Stellar Collapse and Isolated Neutron Star Binaries,
DIV8 – Waveforms, DIV9 - Common Tools, DIV10 - Data Analysis.

ET and CE sensitivity and configurations

- Results will be presented for the **10 km triangle** and for the **2L 15 km misaligned configuration** (when available in published paper and for new work);
- Sensitivity curves HFLF CoBA studies (not significantly different from ET-D for 10 km HFLF);
- For CE sensitivities of the 40 km and 20 km as given in CE web-page.

Milestones/Timeline

- Updated science case for the ET design comparison (Branchesi, Maggiore et al. 2023, JCAP) **COMPLETED**
- Fisher matrix softwares (GWFast, GWFish, GWBench, TiDoFM) comparison to obtain metrics; **COMPLETED**
- First draft (highlighted contents, some texts and plots) for each division end of March; **COMPLETED**
- submit mature draft for internal review end of June (strict deadline); **REASONABLY ON TRACK**
- mature reviewed version over summer, to work on the assembly early autumn