Einstein Telescope Observational Science Board (OSB)

Michele Maggiore (for the OSB chairs)

ET Monthly Meeting, Feb. 7, 2022

ET monthly meetings:

- a general update of OSB activities (OSB chairs)

- an update from a division
  today div 2 (Cosmology)

  and/or presentation of a paper of special interest

Structure of the OSB

- **Div1: Fundamental Physics**
  Chris van den Broeck, Paolo Pani, Rafael Porto

- **Div2: Cosmology**
  Archisman Ghosh, Mairi Sakellariadou, Angelo Ricciardone

- **Div3: Population studies**
  Giulia Cusin, Michela Mapelli, Antonio Riotto

- **Div4: Multimessenger observations**
  Giancarlo Ghirlanda, Stephen Smartt, Susanna Vergani

- **Div5: Synergies with other GW observatories**
  (under reorganization)

- **Div6: Nuclear Physics**
  Tim Dietrich, Tanja Hinderer, Michaela Oertel

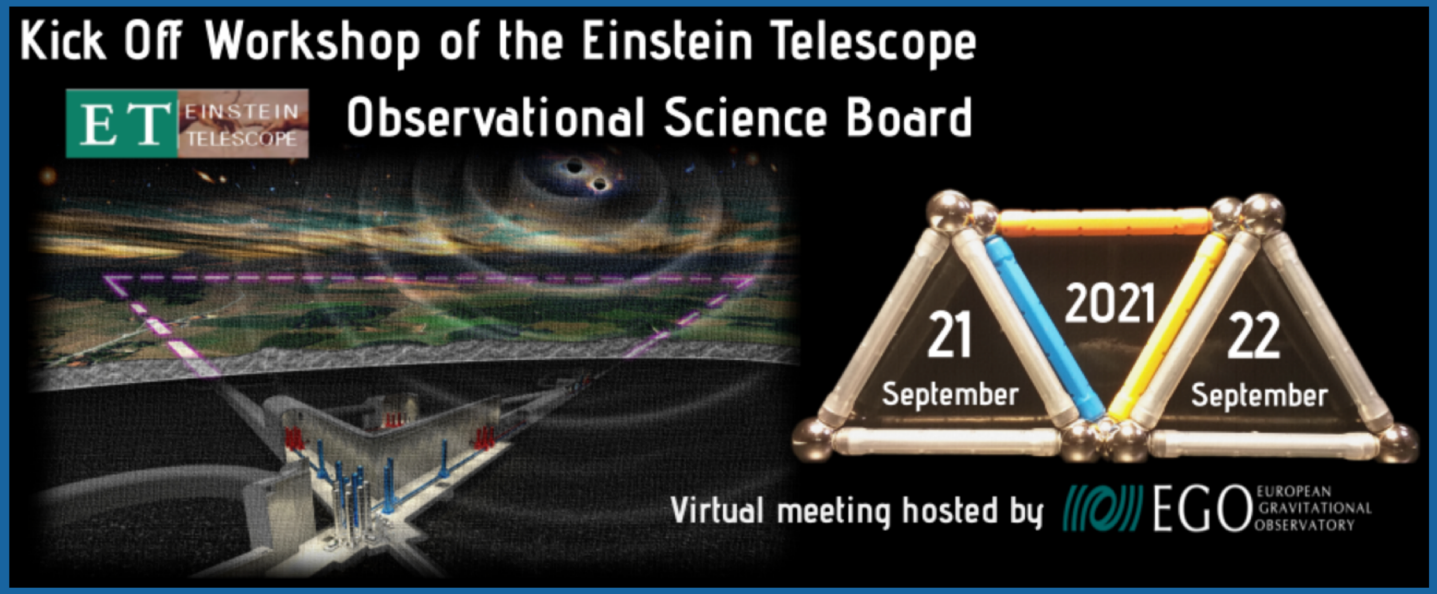
- **Div7: Stellar collapse and isolated neutron stars**
  Marie-Anne Bizouard, Enrico Cappellaro, Pablo Cerda-Duran

- **Div8: Waveforms**
  Laura Bernard, Harald Pfeiffer, Patricia Schmidt

- **Div9: Scientific potentials of different detector configurations, and common tools**
  Michal Bejger, Ik Siong Heng, Andrea Maselli

- **Div10: Data analysis platform**
  Chris van den Broeck, Elena Cuoco, Tania Regimbau, John Veitch

Activities started since ~ last October



Kick Off Workshop of the ET Observational Science Board

21–22 Sep 2021
Online
Europe/Rome timezone

Enter your search term

Overview
Timetable

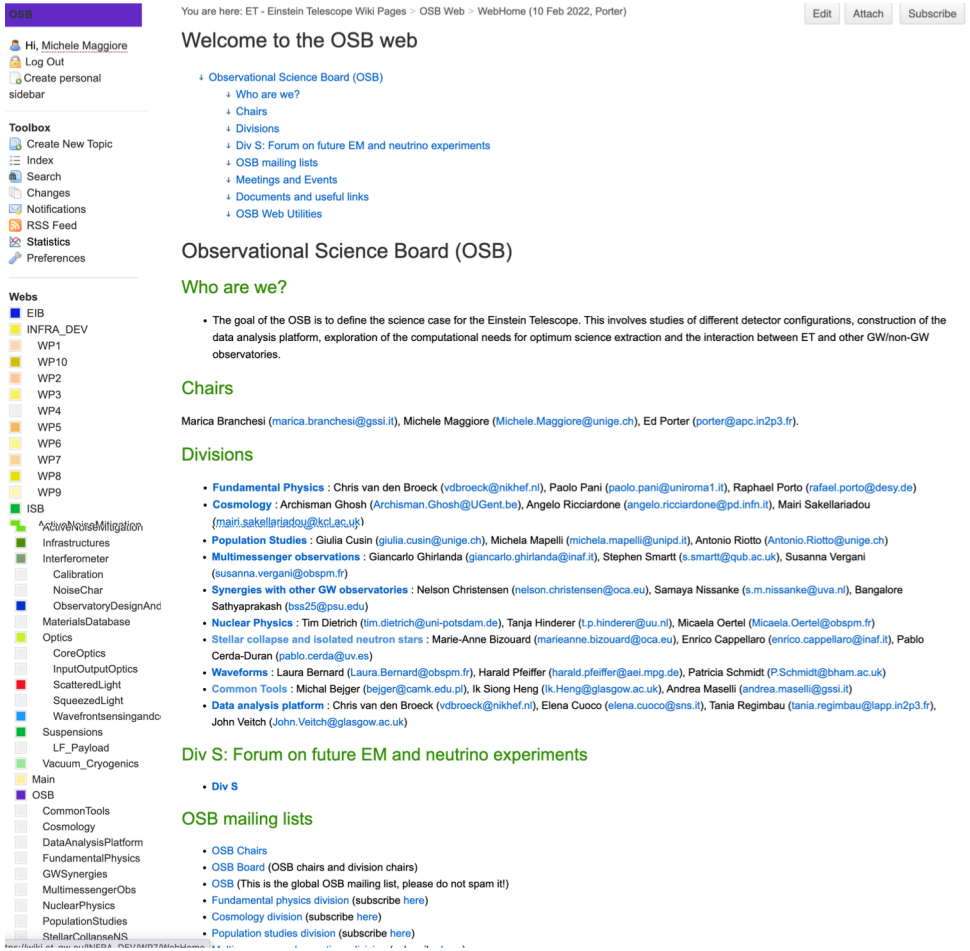
Participant List
553 participants

The development of the Science Case will be structured around a `Blue Book', a living document that summarizes and updates original work related to ET

Each division will contribute to one chapter
(timescale: 4yr)

The coordinators organize the activity in each division (key problems, work packages, regular meetings,…) and eventually select the most relevant results

Initial phase of the work: organization of the divisions, setting up mailing lists, wiki... https://wiki.et-gw.eu/OSB



OSB

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Create personal sidebar

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DataAnalysisPlatform
FundamentalPhysics
GWSynergies
MultimessengerObs
NuclearPhysics
PopulationStudies
StellarCollapseNS

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Welcome to the OSB web

- Observational Science Board (OSB)
  - Who are we?
  - Chairs
  - Divisions
  - Div S: Forum on future EM and neutrino experiments
  - OSB mailing lists
  - Meetings and Events
  - Documents and useful links
  - OSB Web Utilities

Observational Science Board (OSB)

Who are we?

- The goal of the OSB is to define the science case for the Einstein Telescope. This involves studies of different detector configurations, construction of the data analysis platform, exploration of the computational needs for optimum science extraction and the interaction between ET and other GW/non-GW observatories.

Chairs

Marica Branchesi (marica.branchesi@gssi.it), Michele Maggiore (Michele.Maggiore@unige.ch), Ed Porter (porter@apc.in2p3.fr).

Divisions

- **Fundamental Physics** : Chris van den Broeck (vdbroeck@nikhef.nl), Paolo Pani (paolo.pani@uniroma1.it), Raphael Porto (rafael.porto@desy.de)
- **Cosmology** : Archisman Ghosh (Archisman.Ghosh@UGent.be), Angelo Ricciardone (angelo.ricciardone@pd.infn.it), Mairi Sakellariadou (mairi.sakellariadou@kcl.ac.uk)
- **Population Studies** : Giulia Cusin (giulia.cusin@unige.ch), Michela Mapelli (michela.mapelli@unipd.it), Antonio Riotto (Antonio.Riotto@unige.ch)
- **Multimessenger observations** : Giancarlo Ghirlanda (giancarlo.ghirlanda@inaf.it), Stephen Smartt (s.smartt@qub.ac.uk), Susanna Vergani (susanna.vergani@obspm.fr)
- **Synergies with other GW observatories** : Nelson Christensen (nelson.christensen@oca.eu), Samaya Nissanke (s.m.nissanke@uva.nl), Bangalore Sathyaprakash (bss25@psu.edu)
- **Nuclear Physics** : Tim Dietrich (tim.dietrich@uni-potsdam.de), Tanja Hinderer (t.p.hinderer@uu.nl), Micaela Oertel (Micaela.Oertel@obspm.fr)
- **Stellar collapse and isolated neutron stars** : Marie-Anne Bizouard (marieanne.bizouard@oca.eu), Enrico Cappellaro (enrico.cappellaro@inaf.it), Pablo Cerda-Duran (pablo.cerda@uv.es)
- **Waveforms** : Laura Bernard (Laura.Bernard@obspm.fr), Harald Pfeiffer (harald.pfeiffer@aei.mpg.de), Patricia Schmidt (P.Schmidt@bham.ac.uk)
- **Common Tools** : Michal Bejger (bejger@camk.edu.pl), Ik Siong Heng (Ik.Heng@glasgow.ac.uk), Andrea Maselli (andrea.maselli@gssi.it)
- **Data analysis platform** : Chris van den Broeck (vdbroeck@nikhef.nl), Elena Cuoco (elena.cuoco@sns.it), Tania Regimbau (tania.regimbau@lapp.in2p3.fr), John Veitch (John.Veitch@glasgow.ac.uk)

Div S: Forum on future EM and neutrino experiments

- **Div S**

OSB mailing lists

- OSB Chairs
- OSB Board (OSB chairs and division chairs)
- OSB (This is the global OSB mailing list, please do not spam it!)
- Fundamental physics division (subscribe here)
- Cosmology division (subscribe here)
- Population studies division (subscribe here)

Most divisions are organizing monthly meetings, WPs, etc...

Typically, 25-50 people connected

to participate to the activity of a division, subscribe to the corresponding mailing list in the OSB wiki
(need ET credentials)

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- Scientific potentials of differnt detector configurations and common tools division (subscribe here)
- Data analysis platform division (subscribe here)

Publication policy

see https://wiki.et-gw.eu/OSB

OSB Publication Policy

- Upload the paper to the ET-TDS (https://apps.et-gw.eu/tds/) where you can login with your ET credentials. This will generate the ET preprint number.
- Send an email to Et-osb-all@ego-gw.it and to et-isb-all@mail.ego-gw.it to inform that the paper has been upload (you can also directly attach the pdf to the email, if you wish). These lists are moderated, so the OSB and ISB (Instrument Science Board) chairs will have to authorize your message. Correspondingly, there will be no spam from people inadvertently doing a reply-all to your message.
- At the same time, send an email to the coordinators of the relevant OSB division, and one of them will make a quick review of the paper.
- Wait one week for comments, and then (unless there have been comments that need to be addressed) you can send the paper to the arxiv and/or to the journal.
- All papers that have gone through the circulation procedure are now being collected on the ET page at the address http://www.et-gw.eu/index.php/observational-science-board . This page is public, i.e. can be seen without having ET credentials. If you wish, you could mention this link in your papers, as a repository of ET papers. Hopefully, this will become a place where people go and look for relevant ET papers, giving further visibility to our work.
- If you have a paper that has gone through the circulation procedure but does not appear on this public list, please contact Ed (porter@apc.in2p3.fr).
- For future papers, once your papers has gone through the above circulation, go to the wiki page of your division (first go to https://wiki.et-gw.eu/OSB ; this requires your ET credentials. From there, go to the OSB page of your division). Follow the Publication link and add your paper in the format required (you have editing rights, thanks to your ET credentials). These pages are accessible only to the ET Community, through your ET credentials.
- About once per month, Ed will go to each division page and harvest the new publications, to put them on the public webpage http://www.et-gw.eu/index.php/observational-science-board (for which only Ed has editing right).

OSB public page

https://www.et-gw.eu/index.php/observational-science-board

Main Menu

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ET Project

- ET Collaboration Announcement
- XII ET Symposium

Observational Science Board

Details

Written by: Giada Rossi

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The goal of the OSB is to define the science case for the Einstein Telescope. This involves studies of different detector configurations, construction of the data analysis platform, exploration of the computational needs for optimum science extraction and the interaction between ET and other GW/non-GW observatories.

The current chairs of the OSB are Marica Brachesi (GSSI-Italy, marica.branchesi@gssi.it), Michele Maggiore (University of Geneva - Switzerland, Michele.Maggiore@unige.ch) and Ed Porter (APC - France, porter@apc.in2p3.fr).

News

The ET Executive Board decided to have regular meeting, in general the first Tuesday of each month, where to disseminate the status of the activity and to discuss the most hot topics. The next (first) meeting of this series is scheduled for the 4th of October, 4pm, via Zoom

The XII symposium of the Einstein Telescope (ET) took place in Budapest, at the Hungarian Academy of Sciences, on the 7th - 8th of June. The ET scientific community met in

OSB publications

A full list of OSB publications can be found here.

Most recent OSB publications

- *Forecasting the detection capabilities of third-generation gravitational-wave detectors using GWFAST;* F. Iacovelli, M. Mancarella, S. Foffa, M. Maggiore (arXiv:2207.02771)
- *GWFAST: a Fisher information matrix Python code for third-generation gravitational-wave detectors;* F. Iacovelli, M. Mancarella, S. Foffa, M. Maggiore (arXiv:2207.06910)
- *Impact of correlated seismic and correlated Newtonian noise on the Einstein telescope;* K. Janssens, G. Boileau, N. Christensen, F. Badaracco, N. van Remortel (arXiv:2206.06809)
- *Impact of ultralight bosonic dark matter on the dynamical bar-mode instability of rotating neutron stars;* F. Di Giovanni, N. Sanchis-Gual, D. Guerra, M. Miravet-Tenés, P. Cerdá-Durán, J. Antonio Font (arXiv:2206.00977)
- *Sensitivity of Neutron Star Observations to Three-nucleon Forces;* A. Sabatucci, O. Benhar, A. Maselli, C. Pacilio (arXiv:2206.11286)
- *Formulation of an extended null channel formalism for a triangular gravitational wave interferometer configuration in the case of non-identical and correlated noise;* K. Janssens, G. Boileau, M.-A. Bizouard, N. Christensen, T. Regimbau, N. van Remortel (arXiv:2205.00416)
- *GWFish: A simulation software to evaluate parameter-estimation capabilities of gravitational-wave detector networks;* J. Harms, U. Dupletsa, B. Baerjee, M. Branchesi, B. Goncharov, A. Maselli, A. Carolina Silva Oliviera, S. Ronchini, J. Tissino (arXiv:2205.02499)
- *Detecting the impact of nuclear reactions on neutron star mergers through gravitational waves;* P. Hammond, N. Andersson, I. Hawke (arXiv:2205.11377)
- *Perspectives for multi-messenger astronomy with the next generation of gravitational-wave detectors and high-energy satellites; S.* Ronchini, M. Branchesi, G. Oganesyan, B. Banerjee, U. Dupletsa, G. Ghirlanda, J. Harms, M. Mapelli, F. Santoliquido (arXiv:2204.01746)
- *Utilizing the null stream of Einstein Telescope;* B. Goncharov, A. Nitz, J. Harms (arXiv:2204.08533)
- *Impact and detectability of spin-tidal couplings in neutron star inspirals;* G. Castro, L. Gualtieri, A. Maselli, P. Pani (arXiv:2204.12510)
- *Gravitational waves from accretion-induced descalarization in massive scalar-tensor theory;* H.-J. Kuan, A. G. Suvorov, D. D. Doneva,and S. S. Yazadjiev (arXiv:2203.03672)
- *Gravitational radiation from inspiralling compact objects: Spin effects to fourth Post-Newtonian order;* G. Cho, R. Porto, Z. Yang

to the whole Collaboration.

During the meeting in Budapest, the ET Collaboration Board (CB) was constituted, temporary chaired by Dr. H. Lueck (AEI), composed of the representatives from each of the 79 research units from 13 countries. During the first CB meeting, the ET Collaboration discussed the recently created ET bylaws that will govern the future of the experiment and initiated procedures to set up the required Collaboration committees. In addition, interim ET Spokesperson (Michele Punturo, INFN) and Deputy Spokesperson (Harald Lueck) figures were identified.

With the birth of the ET Collaboration, this symposium marks a milestone on the long journey of the Einstein Telescope endeavour.

Links:
https://indico.ego-gw.it/event/411

Dear colleagues

The long journey of the Einstein Telescope (ET) has reached a crucial point: we are ready to launch the

Some recent highlights

- Development and comparison of Fisher matrix codes for theoretical parameter estimation for BBH, BNS, BHNS (GSSI, Geneva, Glasgow)

  development of common tools within the OSB
  comparison with related work performed within CE (Penn)

- Science part of the `CoBA' (Cost-Benefit Analysis) process

study of how the science case changes with different geometries (triangle vs 2L) and different PSD

commissioned by agencies, 80+ people involved (1.5 yr of work)
coordinated by MB and MM

first draft presented at the Collaboration Meeting (Nov. 15-17)
currently under internal ET review

structure of the work

Contents

Independently of the comparison between geometries, it is currently the most detailed study of the science that can be done with ET

Latest release: ET-0291C-22, 11/01/23
under ET internal review