# OSB **Div9**: Scientific potential of different detector configurations, and common tools

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### What this division is about



- providing <u>publicly available</u> tools to
  - calculate the ET capabilities for astrophysical predictions
  - calculate <u>standardized and official</u> figures of merits for different detector configurations / detector networks for the Blue Book and beyond
- providing 'quick' responses to needs of the collaboration for presenting plots and results to funding agencies, outreach, etc., in a consistent manner

#### ET configuration & detector networks



## Common tools - verification and tests

#### Key tools and codes

- Noise Spectral Density of ET different configurations, sensitivity curves, possibility (?) of (rapid?) tuning to a specific frequency range...
- Null stream simulator (?)
- Pattern functions
- Waveform templates and calibration factors
- SNR calculator
- Parameter estimation tools (e.g. Fisher matrix)
- Code verification examples with exemplary data (input data, standard waveforms?)

*Test suite / benchmarks for independent calculations, e.g.:* 

- Verification binaries for amplitudes/SNR
- Verification binaries for small set of parameters

### Common tools - verification and tests

Scope of sharing and storing input data examples / products:

- *Ready-to-use webpage with python tutorials (notebooks) ?*
- Detector locations, orientations and configurations (L-shape vs triangle? Various options for the de-tuning?)
- Mock Data Challenges (=Science Challenges): input data / definitions to generate the standard input data
- *"ET-recolored" real 2G+ detectors' data?*
- Test-case standard input and output data for high frequency and low frequency sensitivities (e.g. ET-D), various combinations of detectors
- Basic documentation

<u>Potentially</u>, we may also need to work out a few guidelines along the way:

- Policy for tools developed by members of the collaboration and shared in the ET repository to secure proper recognition / visibility of authors
- Basic validation / consistency checks for "ET-endorsed" tools (?)

To be discussed with other Divisions (perhaps most crucially at the beginning, with Div10).

Also:

• Contribute to training / dissemination / education & outreach activities (?)

#### Possible flow diagram/pipeline prototype

![](_page_6_Figure_1.jpeg)

#### Science Cases / Work Packages

*Open question to the OSB community:* 

What are your important **F**igures **O**f **M**erit?

• Horizon, localization, latency of response (for e.g. MMA), noise / calibration quality, detection rates, ...?

#### Div9 organisation / structure:

- 1. We propose a simple structure of WPs, reflecting the structure of the OSB Divisions (to be adjusted later, if needed)
- 2. The WPs will be used to study Div X-specific science for detector configurations in connection with the ISB.
- 3. This (hopefully) will produce an environment in which the Divs work out a common view on their FOMs / science goals.
- 4. Div9 will collect (& help develop) tools & input data for these FOMs.

## Key infrastructure already in place

#### We are open for business

- wiki <u>https://wiki.et-gw.eu/OSB/CommonTools/WebHome</u>,
- git <u>https://gitlab.et-gw.eu</u>,
- document server <u>https://apps.et-gw.eu/tds/</u>

are set up and *ready* to use.

We need your ideas as input :)

![](_page_8_Picture_7.jpeg)

If you are interested, please join the OSB Div9 mailing list: <u>http://mail.ego-gw.it/mailman/listinfo/et-osb-tools</u>