WORKING WITH LISA DATA

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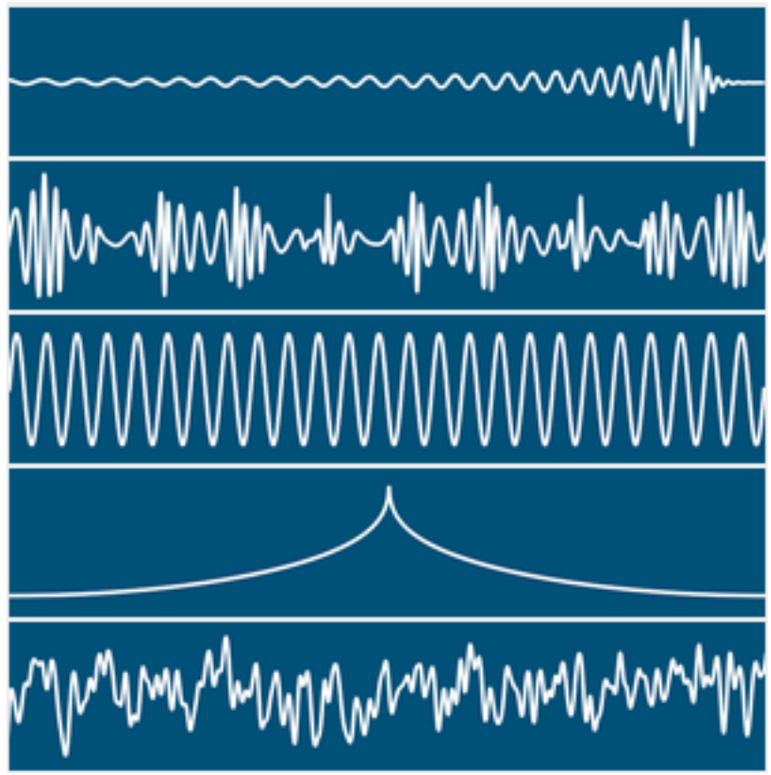
OUTLINE

1. Presentation of the LISA data challenge
2. Tutorials:
    1. compact galactic binaries waveform generation
    2. massive black hole binaries

1. PRESENTATION OF THE LISA DATA CHALLENGE

PRESENTATION OF THE LISA DATA CHALLENGE

- The LISA Data Challenge has been resurrected last July. The aims of this initiative are:
  - Project-oriented: demonstrate proof-of-concepts for LISA Data analysis and capability to deliver science requirements (as a working group), develop software standards and pipelines
  - Research-oriented: foster development of data analysis methods and new algorithms
  - Community-oriented: get new actors involved in the challenge of the LISA data analysis and provide tools



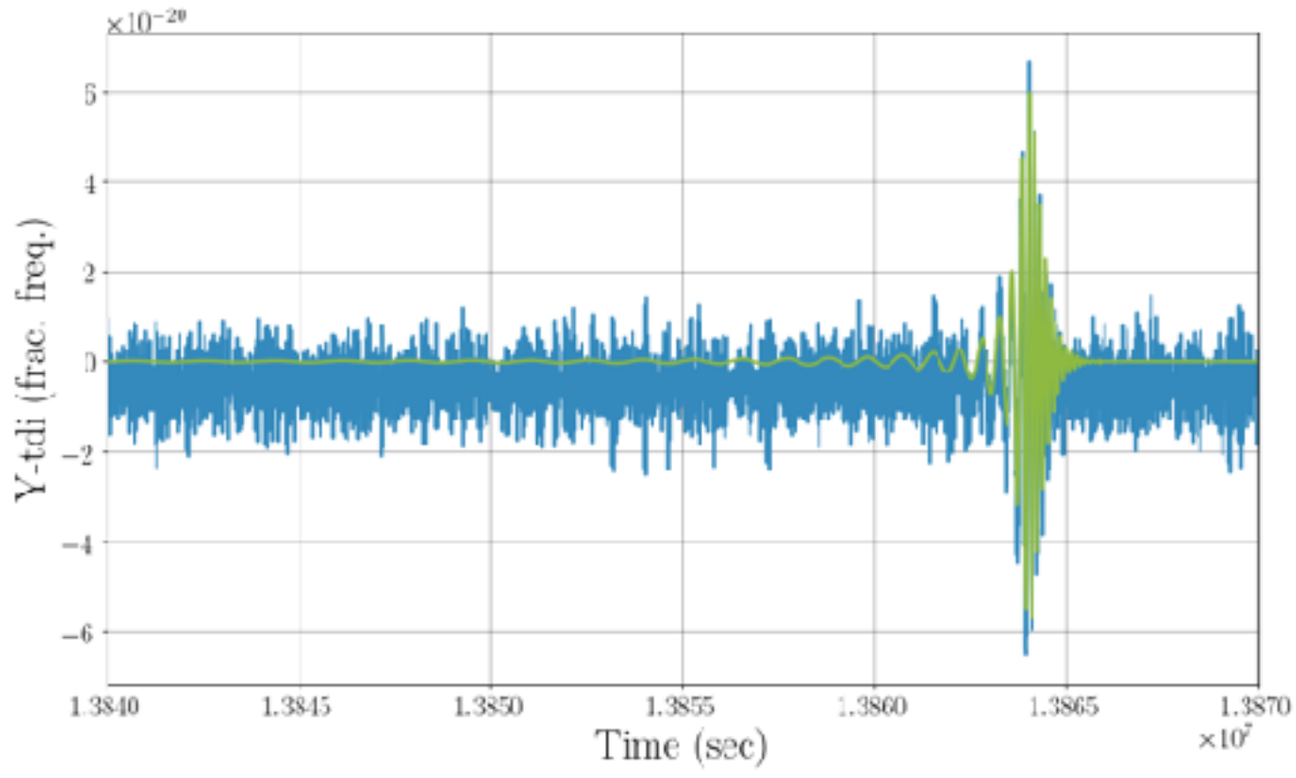
PRESENTATION OF THE LISA DATA CHALLENGE

- The LISA Data Challenge is open to all, you can subscribe here https://lisa-ldc.lal.in2p3.fr/
- A new set of simulated LISA data has been released, dubbed “Radler”
- Its goals are:
  - Establish basic components of LISA data infrastructure
  - Provide accessible single-source type sub-challenges to re-start from the basic problems

PRESENTATION OF THE LISA DATA CHALLENGE

Overview of the sub-challenges:

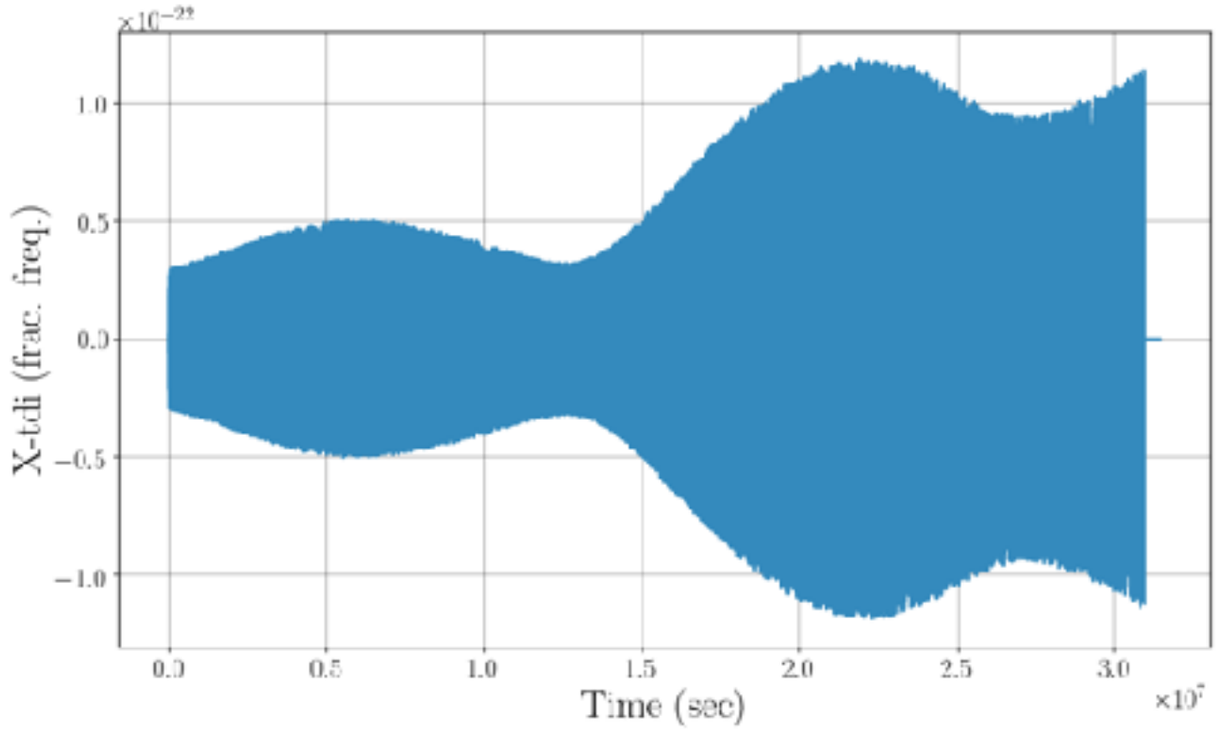
- **LDC1-1**. A single GW signal from a merging massive-black-hole binary.
  - represented with a frequency-domain inspiral–merger–ringdown phenomenological model (IMRPhenomD)
  - Include black hole spins



PRESENTATION OF THE LISA DATA CHALLENGE

Overview of the sub-challenges:

- **LDC1-2**. A single GW signal from an extreme-mass-ratio inspiral.

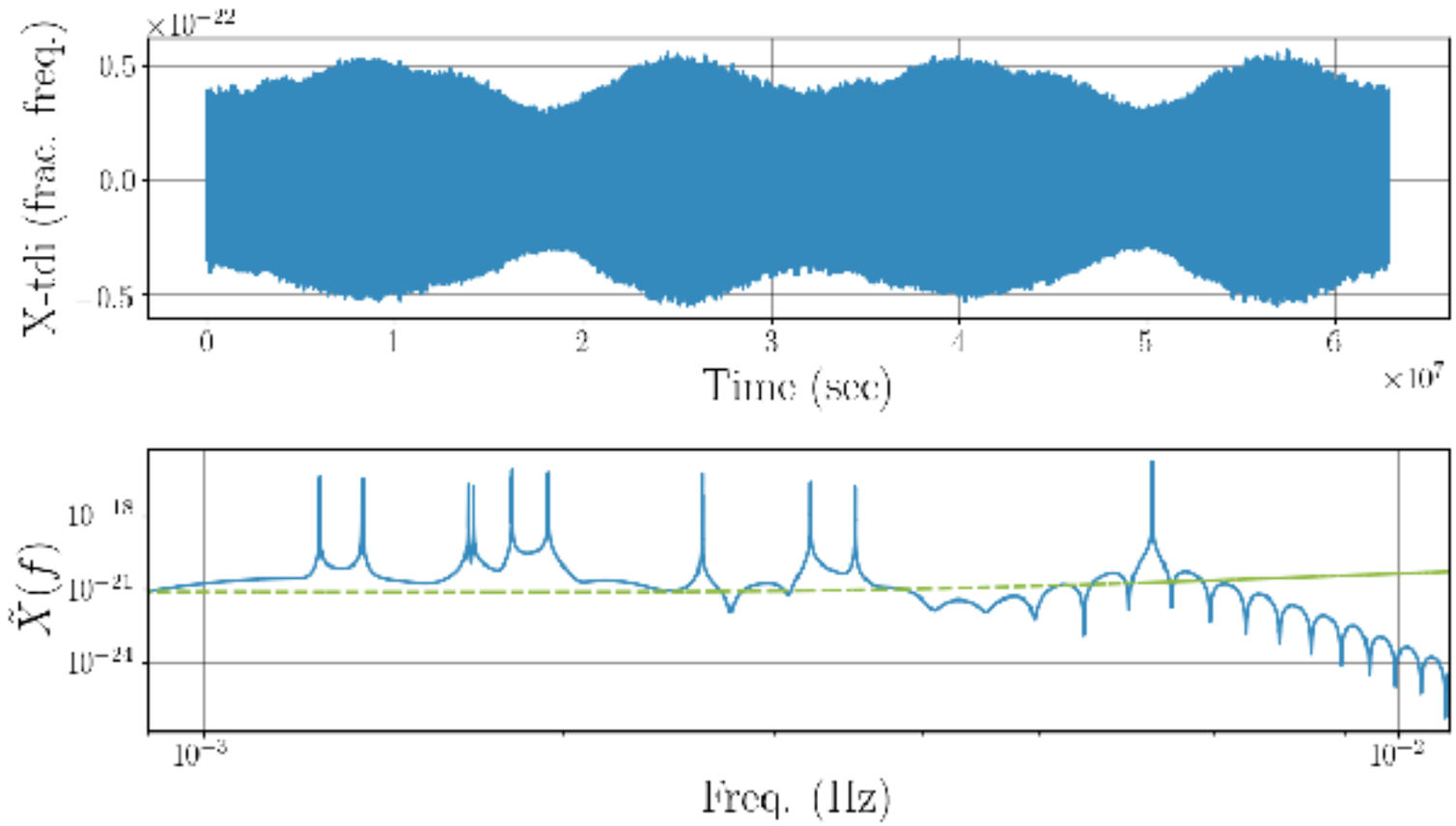


- Produced with Analytic Kludge waveforms
- Will be updated in future challenges

PRESENTATION OF THE LISA DATA CHALLENGE

Overview of the sub-challenges:

- **LDC1-3.** Superimposed GW signals from several verification Galactic white-dwarf binaries.

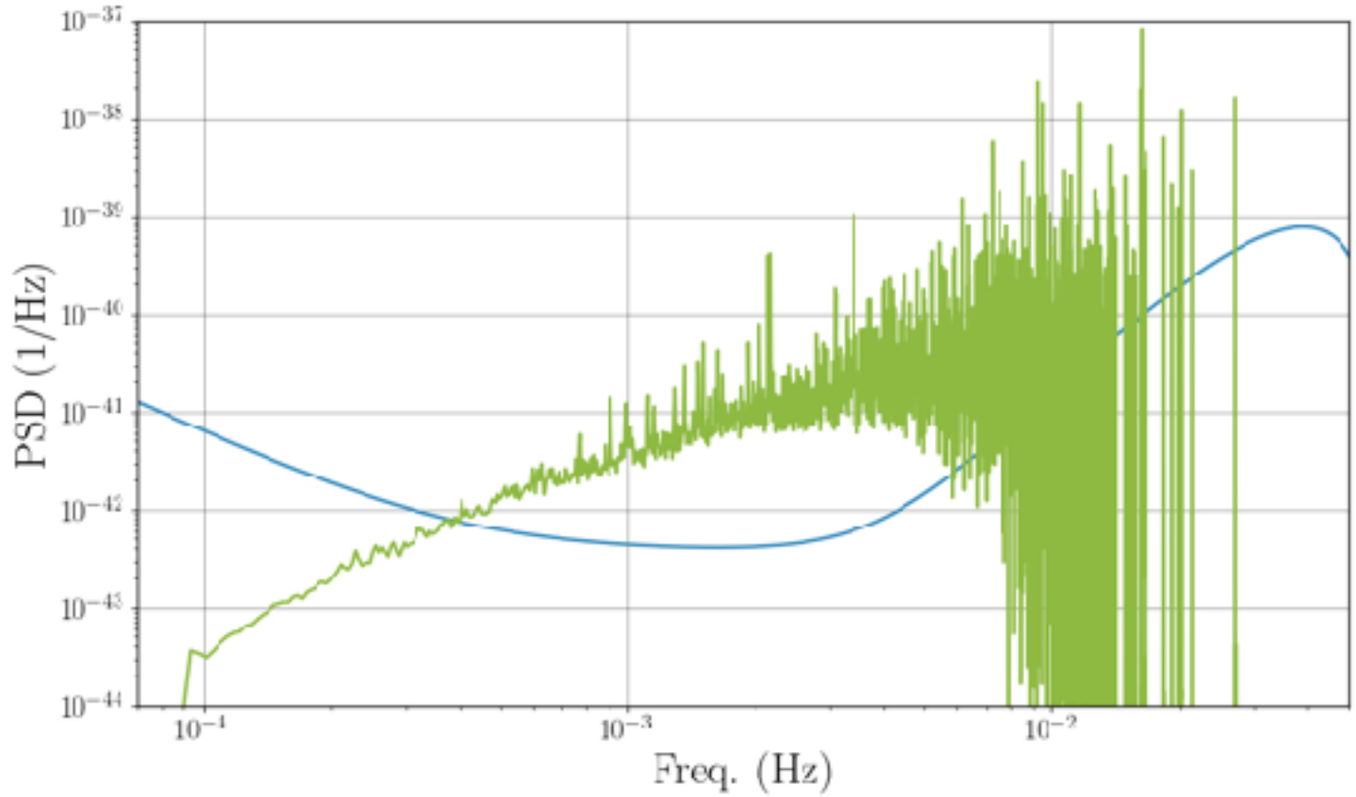


- Produced with fast response code
- A good challenge to begin with

PRESENTATION OF THE LISA DATA CHALLENGE

Overview of the sub-challenges:

- **LDC1-4.** A GW signal from a population of galactic white-dwarf binaries



- Produced with fast response code
- 26 million signals

2. TUTORIALS

- The prerequisites to run the tutorials are
  - to download LDC data sets and codes: https://lisa-ldc.lal.in2p3.fr/
  - to install ldc python codes
- The tutorials are available on a github repository: https://github.com/qbaghi/lisatutos