

Data Processing in LISA

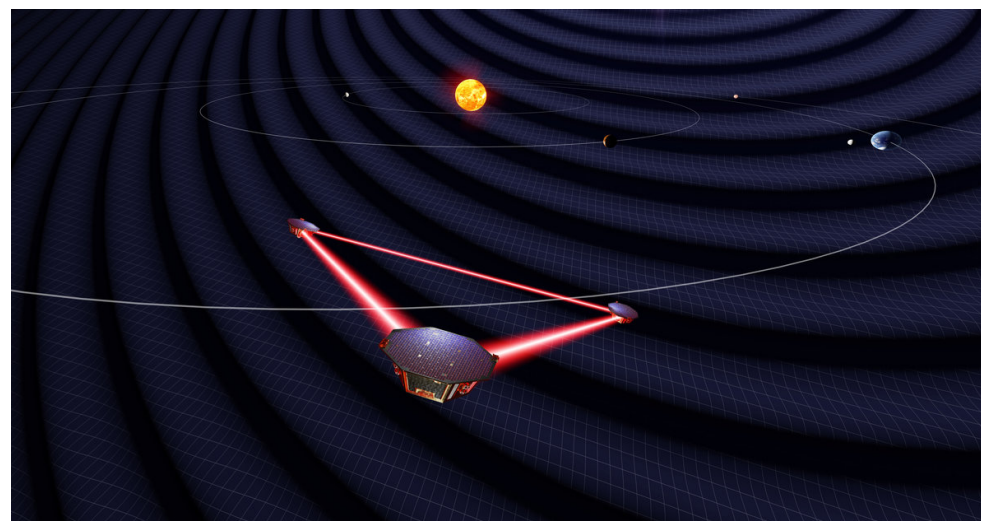
Alexey Bobrick
For LGWA Collaboration

2024

LDC in LISA

- 2030s, mHz astronomy
- Since 1990s, adopted in early 2024
- LISA Consortium (>1000 people)
- LISA Science Team (18 people)
- Astrophysics working group (few 100 people)
- Data processing team (LDC, 150 people)

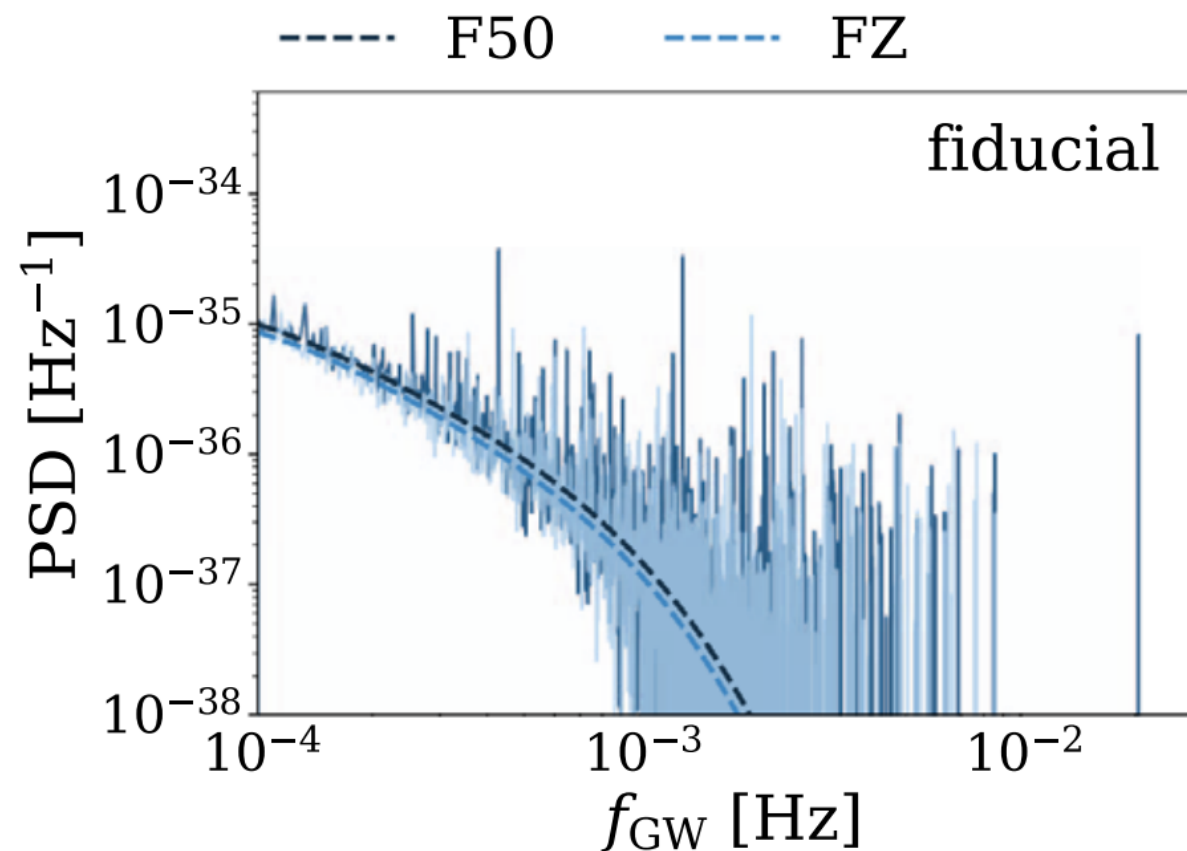
**Disclaimer: I am part of
the Astro WG, not LDC**



Credit: NASA

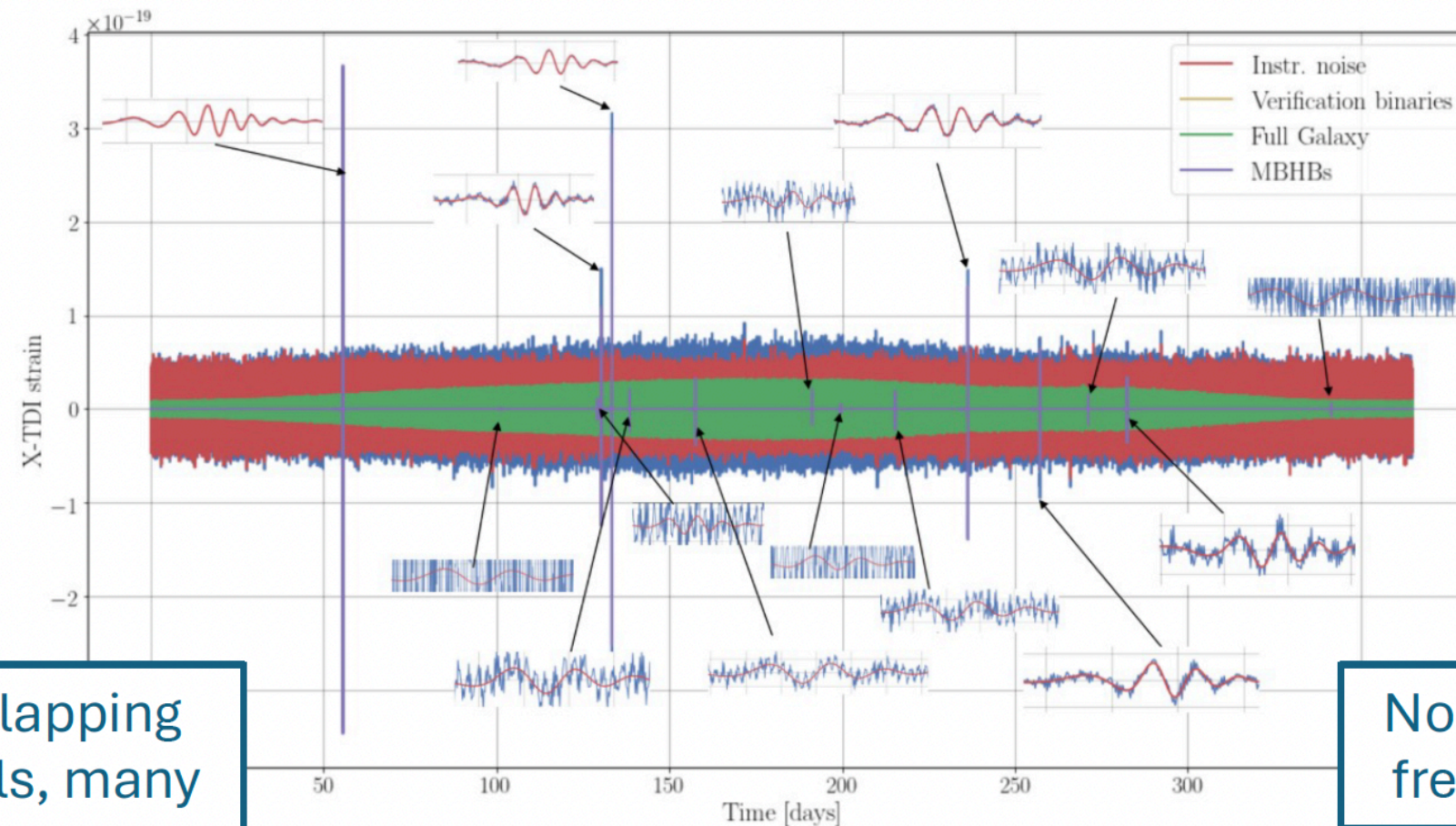
Data in LISA

- **Noise dominated by DWD binaries**
- **13-24 of 26 verification binaries**
- **Global fit, iterative solution (years)**
- **Main sources: DWDs, MBHs, EMRIs**



Credit: **ESO**

LISA Data Analysis Challenges



Overlapping signals, many signal types

LDC2A Sangria Data

No noise-free data

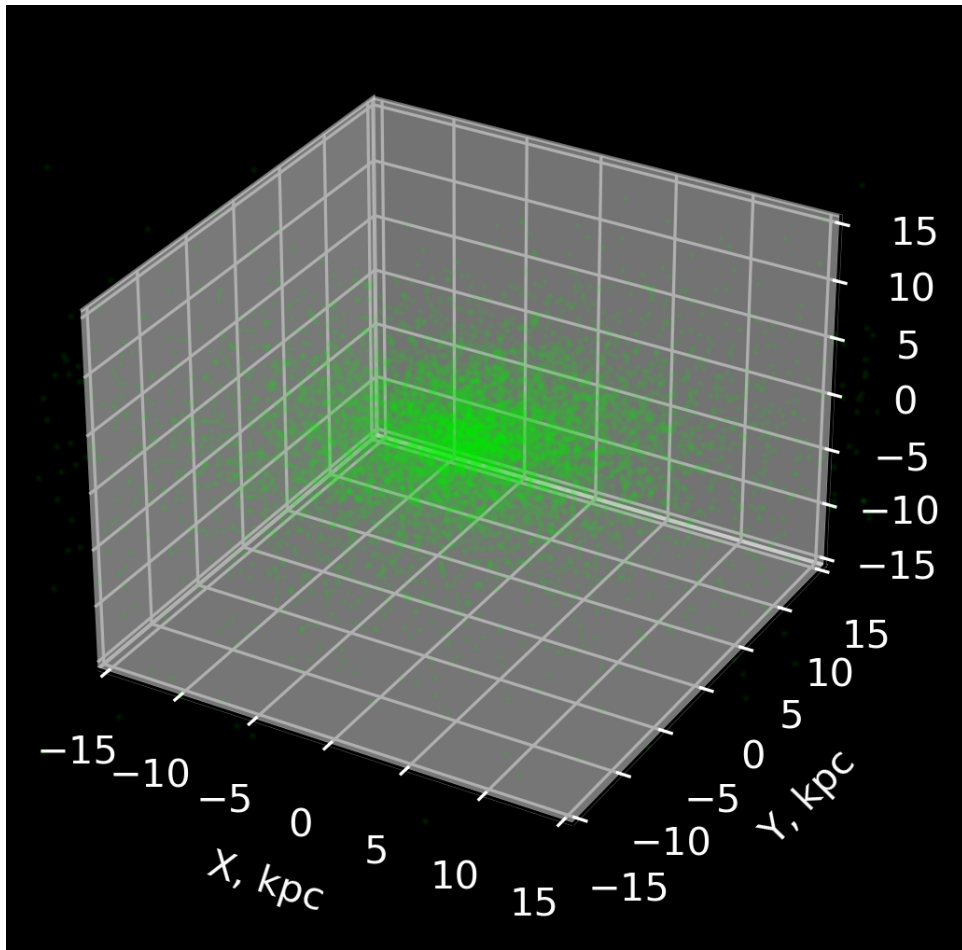
Credit: **M.Katz**

Karnesis+23

Global Fit Implementations

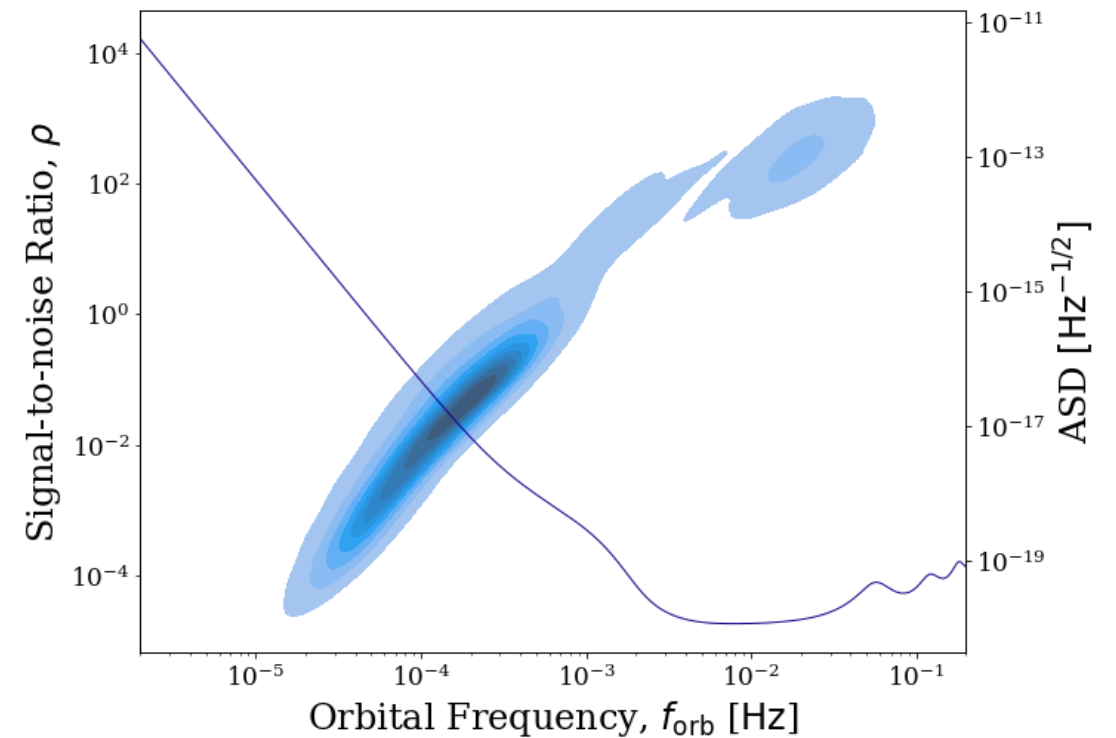
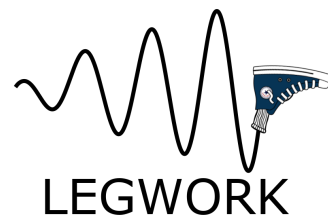
- **GLASS** [Littenberg&Cornish 23](#)
 - On GitHub (ldasoft, lisacattools)
 - RJMCMC, information build-up over time
- **ETH** [Strub+24](#)
 - MLE, 10x faster, week-by-week build-up, publicly available
- **Erebor** [Katz+24](#)
 - RJMCMC, GPUs, in LISA Analys Tools Library
- **Gee-Moo-LISA** [Deng+\(in prep\)](#)
 - PTMCMC on short data segments, MBHs

Light(er)weight Tools



Credit: [Bobrick, Hendriks, Strokov](#)

[Eryn Karnesis+23, On Github](#)



LEGWORK

[Wagg, Breivik, 21 On Github](#)

To learn more: [Valeriya Korol, Michael Katz](#)