

DIVISION 5 SYNERGIES OF EINSTEIN TELESCOPE WITH OTHER GW DETECTORS

lisa









Chairs: M. Colpi, S. Nissanke, B. S. Sathyaprakash, N. Tamanini 80 members



- How do joint observations with ground-based detectors increase the science reach of ET?
- How do complementary observations over a wide GW spectrum increase our knowledge of the Universe offering immense potential for breakthroughs across all fields?



 Division 5 is committed to building stronger connections across all its areas of interest by promoting cross-pollination among diverse communities

• Possible path are now being identified

• Plan a <u>workshop</u> on this theme

• ET - COSMIC EXPLORER - the "network" to observe the entire universe



 Discuss: Virgo Next - ET transition from a scientific perspective in a more quantitative way

- Deeper (z)
- Wider (M)
- Sharper (PE)

- Tracing star formation across comic epochs
- Discover IMBH
- Fundamental physics and cosmology -nuclear physics (with EM counterparts)
- Sky Localisation

• ET-DECIGO-LGWA-LISA



- Revisit estimates on <u>multi-band observations if nearby massive BHB mergers</u> in light of the new discoveries during run O4 is of common interest
- This will spark new (short author list) papers a white paper ?

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- Astrophysics
- Inference Horizon Exploit uncertainties in the parameter estimation of highredshift signals in ET (LISA) to study the repercussions of these uncertainties in <u>interpreting</u> LISA (ET) signals on merging massive black holes at comparable and lower redshifts.
- Shall we really succeed in understanding the origin of seeds with ET LISA only ? <u>How ET events are representative of the "seed" population</u>?
- Extend Population studies to Double WDs (present in LISA sky) using population synthesis models of Double NSs, BHs discussed in the context of LVK and ET for Milky Way like galaxies. ?
- Comparison on the predictions of intermediate mass black holes? White papers/ reviews

•ET-LISA

- Cosmography Fundamental Physics
- <u>Comparison</u> study involving <u>all standard sirens</u> <u>methods</u> based on different <u>observational scenarios</u> involving ET, CE and possibly LISA

•ET-LISA-PTAs

• Early Universe Cosmology: Stochastic GW backgrounds may extend to a wide range of frequencies and carry distinct signatures. Are they hidden below astrophysical backgrounds? A white paper for a "fair" comparison?

• DIVISION 5

• The Division strongly believes that establishing a connection with the Division of Data Analysis is of utmost importance, recognising the potential for meaningful collaboration and mutual enrichment

• Division 5 in Bologna- Contributions

- Unravelling the nature of intermediate-mass black holes with ET and 3rd generation detectors (Arca Sedda)
- The formation of early supermassive black holes and their GW signatures (Nazanin Davari)
- Exploring High-Redshift Compact Binary Evolution with Next-Generation GW Detectors (Divyajyoti)
- Cosmology with GWxHI Cross-Correlation with Future Observatories (Matteo Shultz)
- Concept Study of a Storage Ring Gravitational Wave Observatory for Earth-Based Multiband Detection and Terrestrial Gravity Noise Mitigation (Thorben Schmirander)