

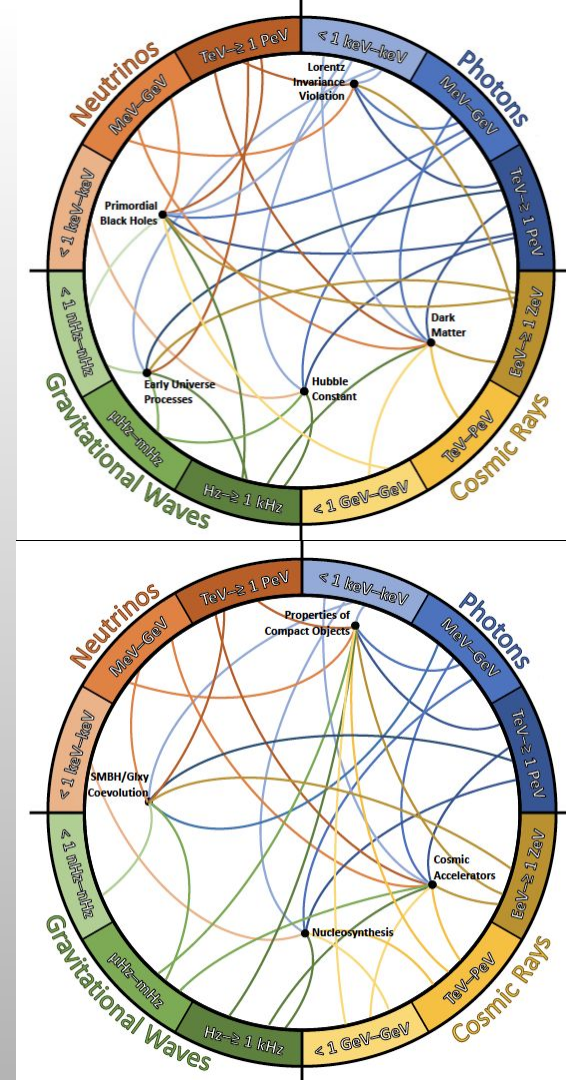
The Multimessenger Science and Facilities Snowmass White Paper

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Key Themes

- Multimessenger science is revolutionizing our understanding of the Universe.
- MM observations can test or reveal physics in ways that are not possible on Earth.
- Access to 3 of the 4 messengers provided by *physics programs*.
- Need to capitalize on opportunities across *all* messengers in order to fully realize the science.



WP Status

1. Have received nearly all confirmed contributions (*Thank You!*)
2. Currently:
 - a. Editing contributed text
 - b. Drafting Exec. Summary, Introduction, and Conclusion
3. Submit to CF7 (post on arXiv): Mar. 15
4. Solicit feedback from wider community: Mar. 15 – Jun.
5. Final version on arXiv: Jun.

Additional Information

- Read only link to WP: <https://www.overleaf.com/read/kzyjhmbjkytf>
- Public Slack channel: #wp-cf07-multi-messenger

Backup Slides

White Paper Outline

Executive Summary

1. Introduction
2. Tests of Fundamental Physics
 - 2.1. Hubble Constant Measurements
 - 2.2. Early Universe Processes
 - 2.3. Primordial Black Holes
 - 2.4. Dark Matter Detection
 - 2.5. Lorentz Invariance Violation and Spacetime Structure
3. Multimessenger Synergies in Particle Astrophysics
 - 3.1. Active Galactic Nuclei
 - 3.2. Tidal Disruption Events
 - 3.3. Massive Compact Object Binaries
 - 3.4. Stellar Mass Compact Object Binaries
 - 3.5. Other Transients
 - 3.6. Diffuse Backgrounds
4. The Current and Future MM Network
 - 4.1. The Current Landscape
 - 4.2. The Multimessenger Vision
 - 4.3. Enabling Technologies
 - 4.4. Real-time Alert Network Coordination
 - 4.5. MM Facilities
5. Collaboration & Infrastructure
 - 5.1. Forging Multimessenger Era Partnerships
 - 5.2. Data Access & Archiving
 - 5.3. Software
 - 5.4. Outreach, Public Engagement & Citizen Science
 - 5.5. Inclusion, Diversity, Equity & Accessibility
6. Conclusions

Goals of the white paper

- To identify physics and astrophysics that is uniquely enabled or greatly enhanced by MM observations.
- To provide a blueprint of a portfolio of facilities and experiments that will collectively realize the 20-year vision of MM science.

A note about scope:

- Each messenger has at least one solicited Snowmass white paper; our focus is on science that is enabled by observations and detections in more than one messenger