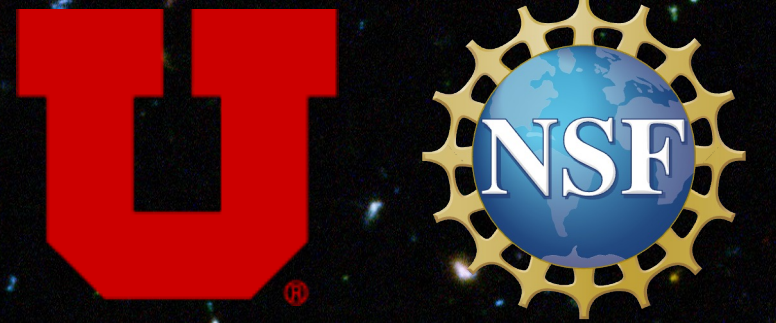


# Science Perspectives of the Cherenkov Telescope Array Observatory

# CTAO

Qi Feng<sup>1</sup> for the CTAO Consortium<sup>2</sup>

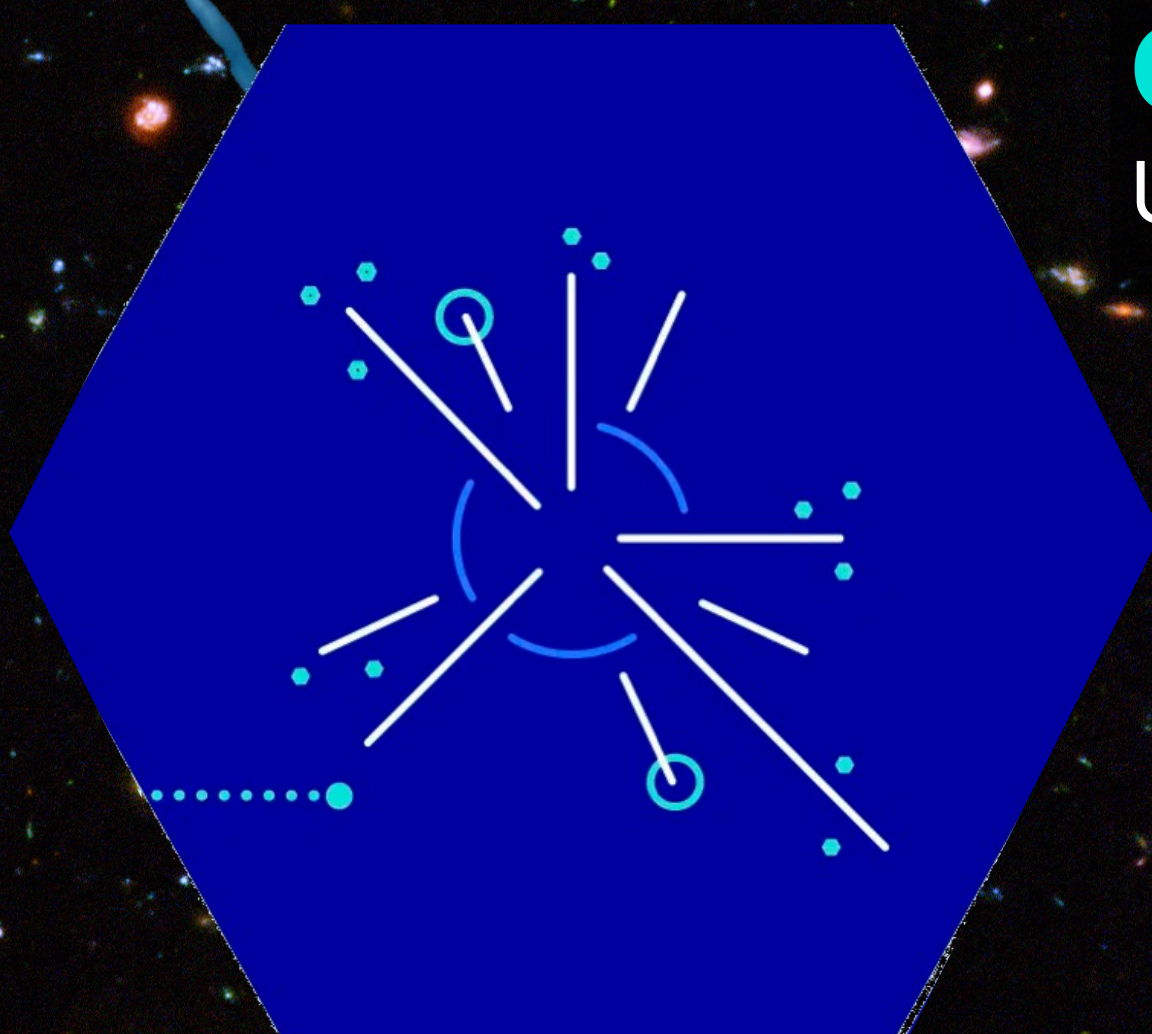
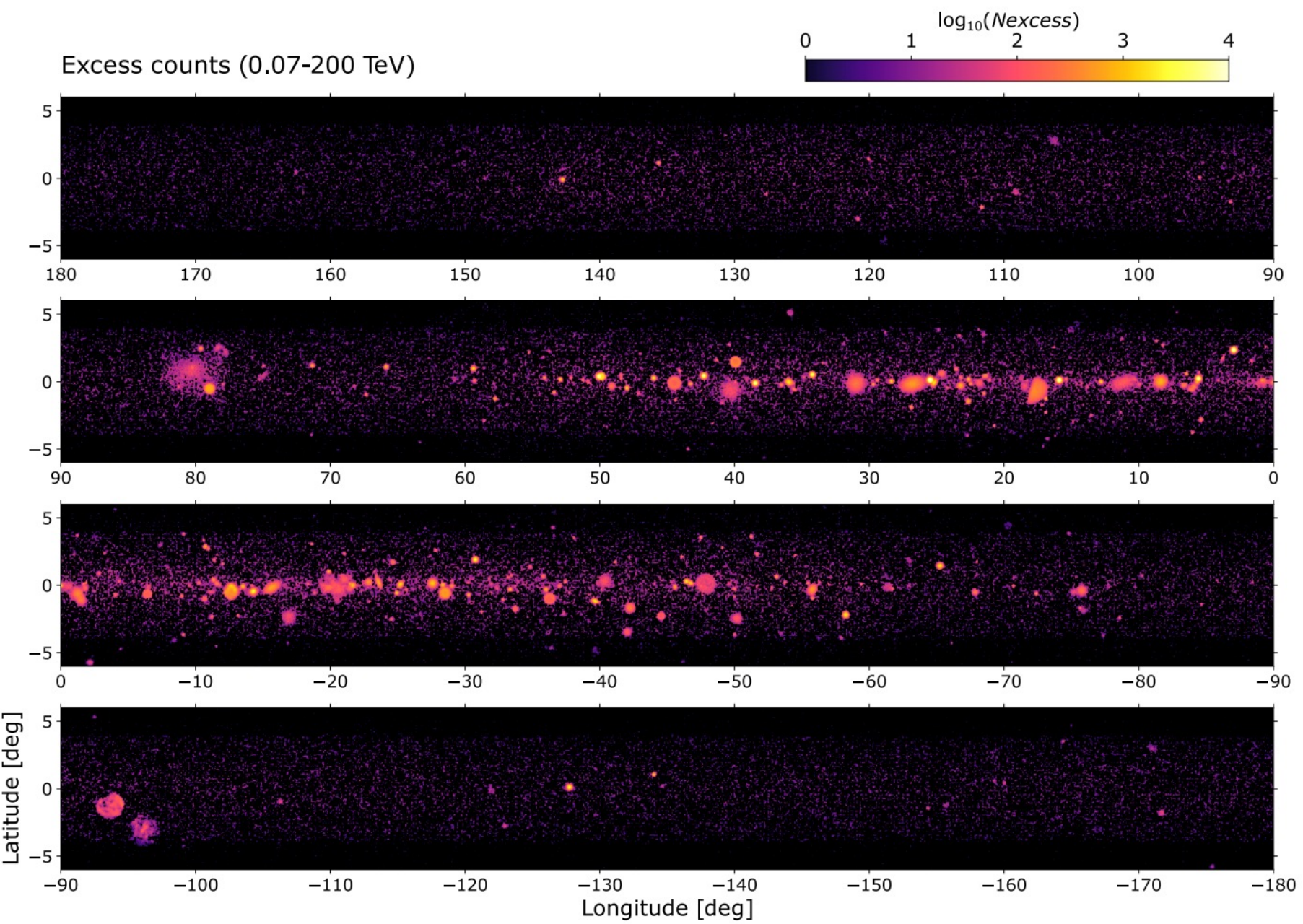
<sup>1</sup>University of Utah, <sup>2</sup>See [www.ctao.org](http://www.ctao.org)



## ABSTRACT

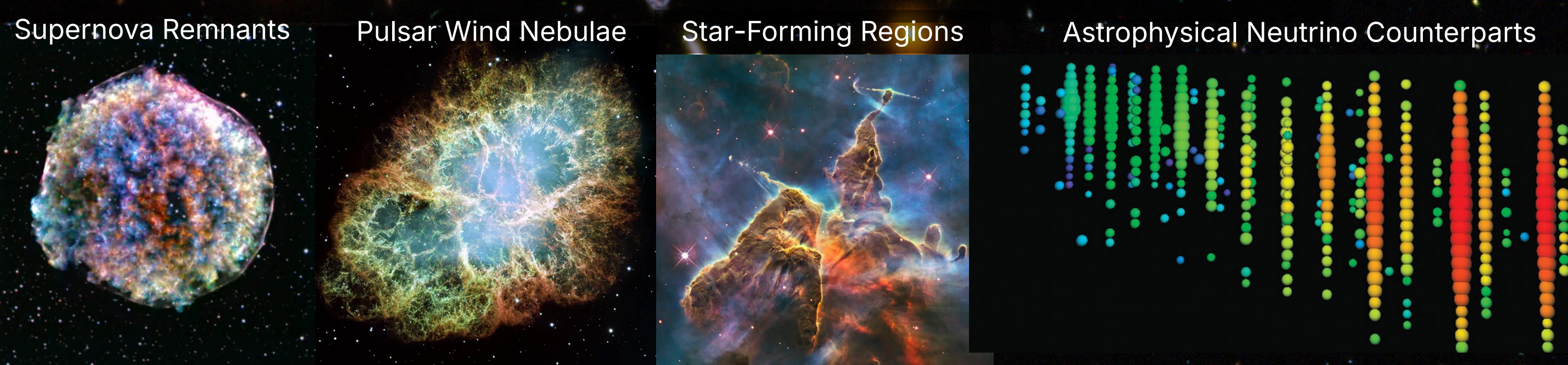
The Cherenkov Telescope Array Observatory (CTAO) is the next-generation ground-based gamma-ray observatory, aiming to achieve superior sensitivity and angular resolution over a broader energy range than current instruments. The CTAO includes two extensive arrays of atmospheric Cherenkov telescopes of three different sizes, located in both the southern and northern hemispheres. One of the medium-sized telescope designs that may be used for the CTAO is the dual-mirror Schwarzschild-Couder Telescope (SCT), offering better optical imaging capability across the field of view compared to its single-mirror counterpart. See below the three main scientific themes of the CTAO and examples of the improved angular resolution and sensitivity that the dual-mirror SCTs can bring to the CTAO.

Simulated CTAO Galactic Plane Survey [1]

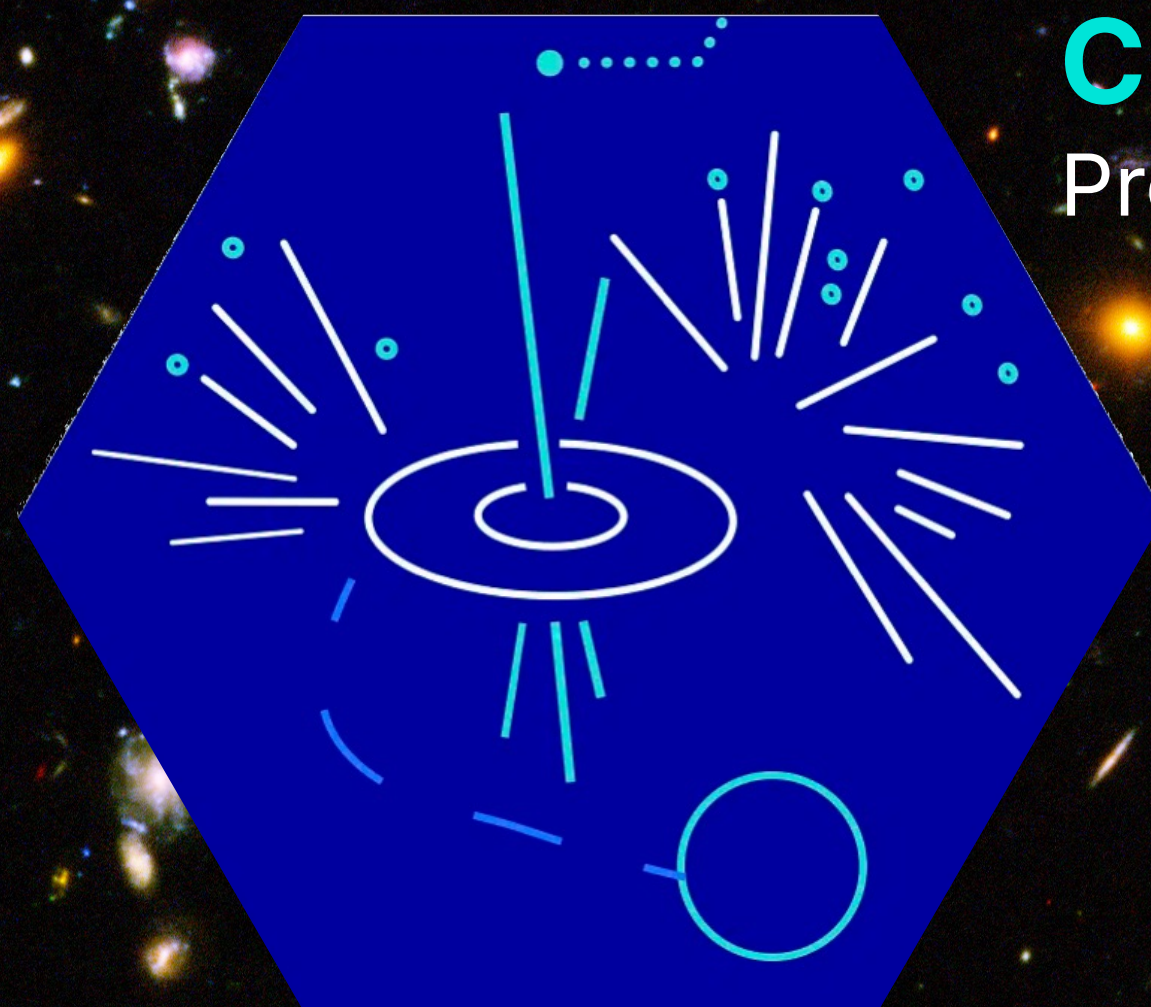
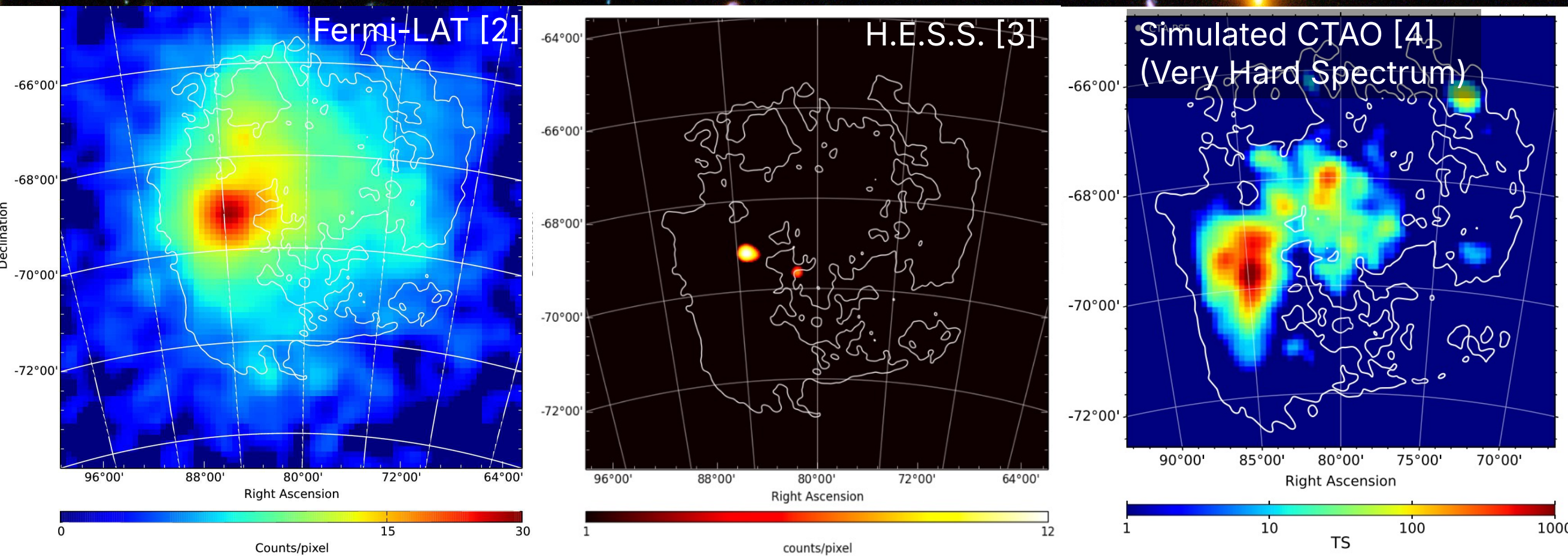


## CTAO Science Theme 1

Understanding the Origin and Role of Relativistic Cosmic Particles

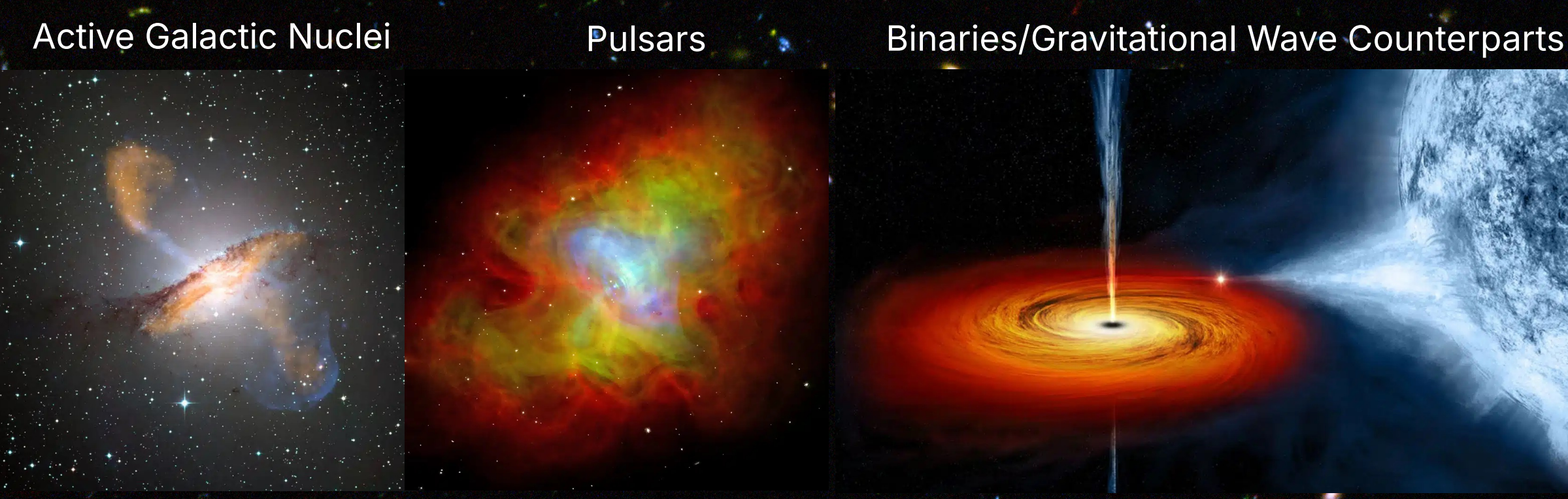


Large Magellanic Cloud

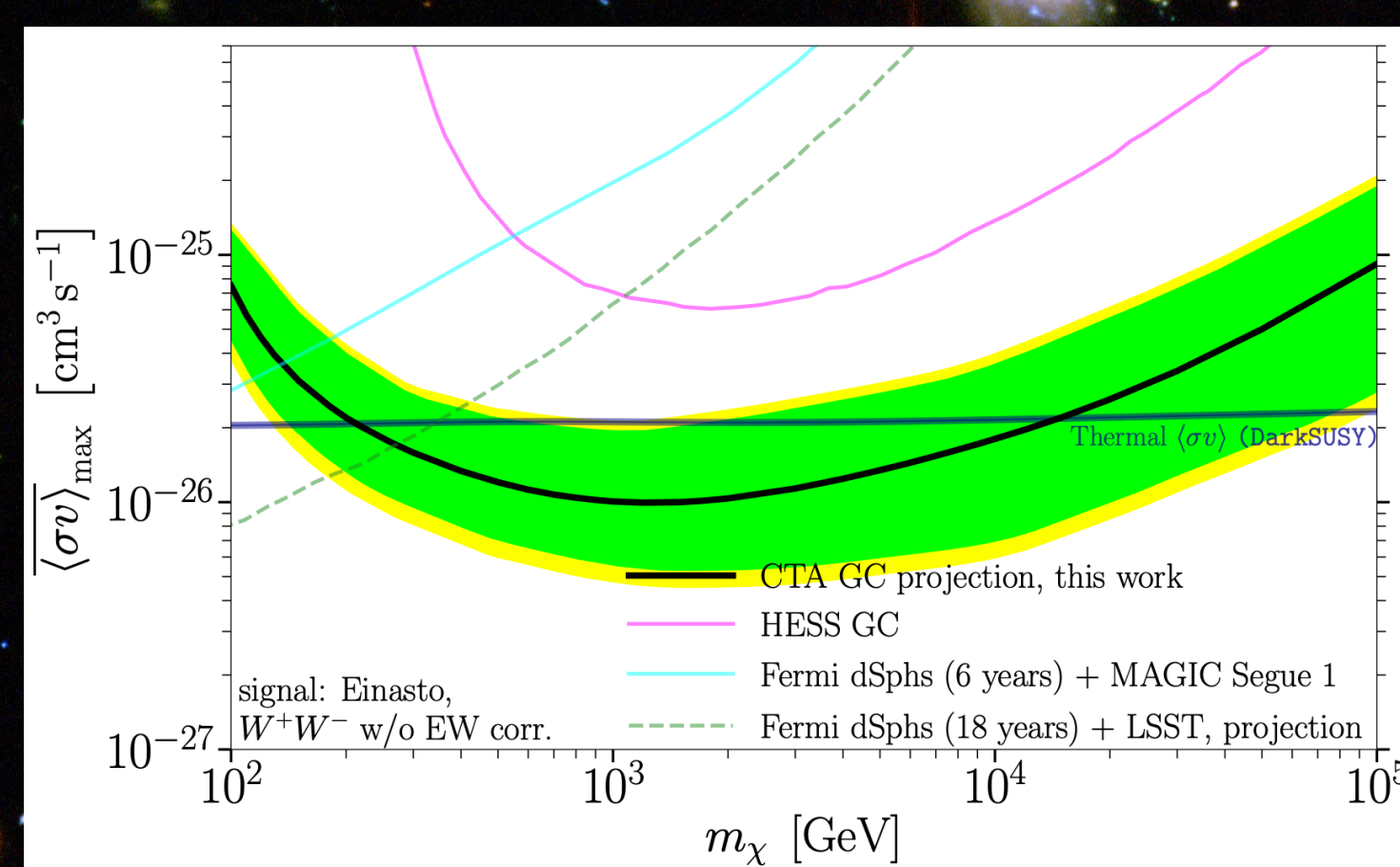


## CTAO Science Theme 2

Probing Extreme Environments in the Universe

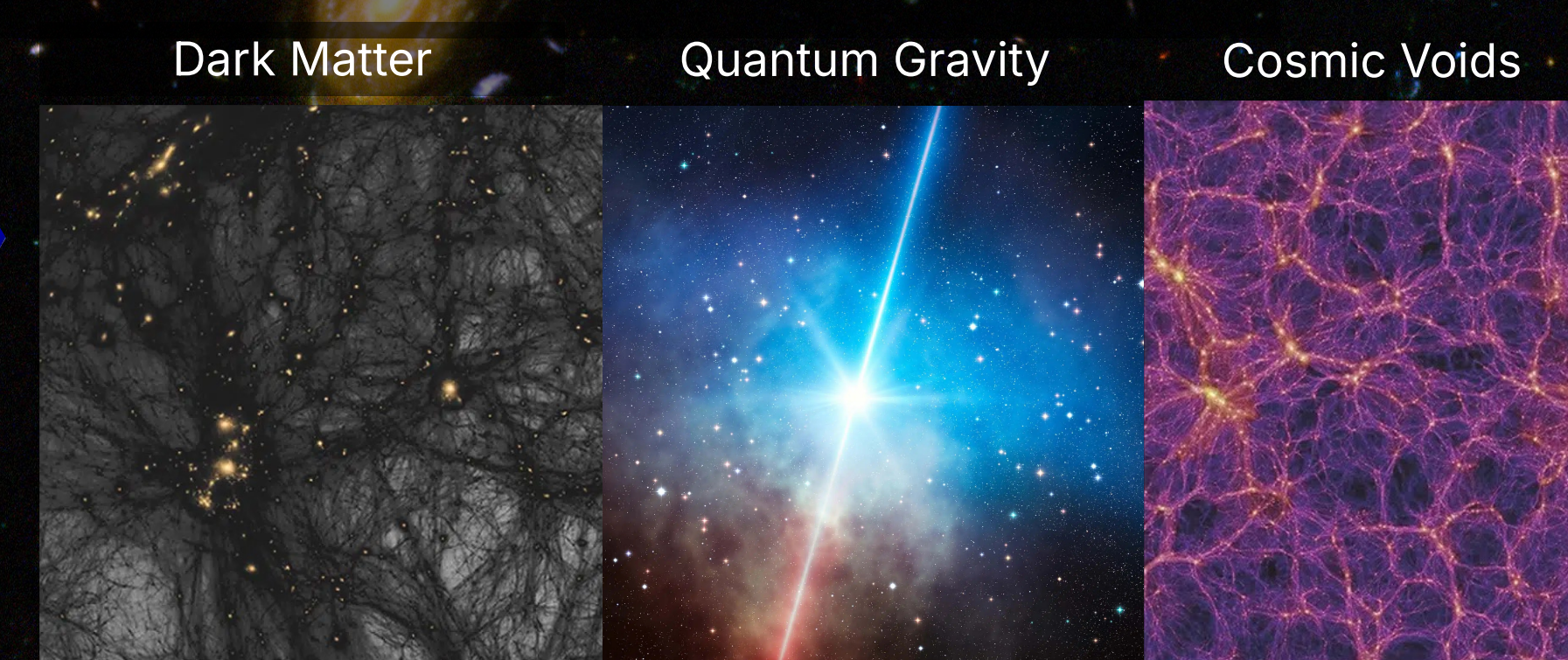


Projected CTAO Sensitivity for Dark Matter Annihilation [6]

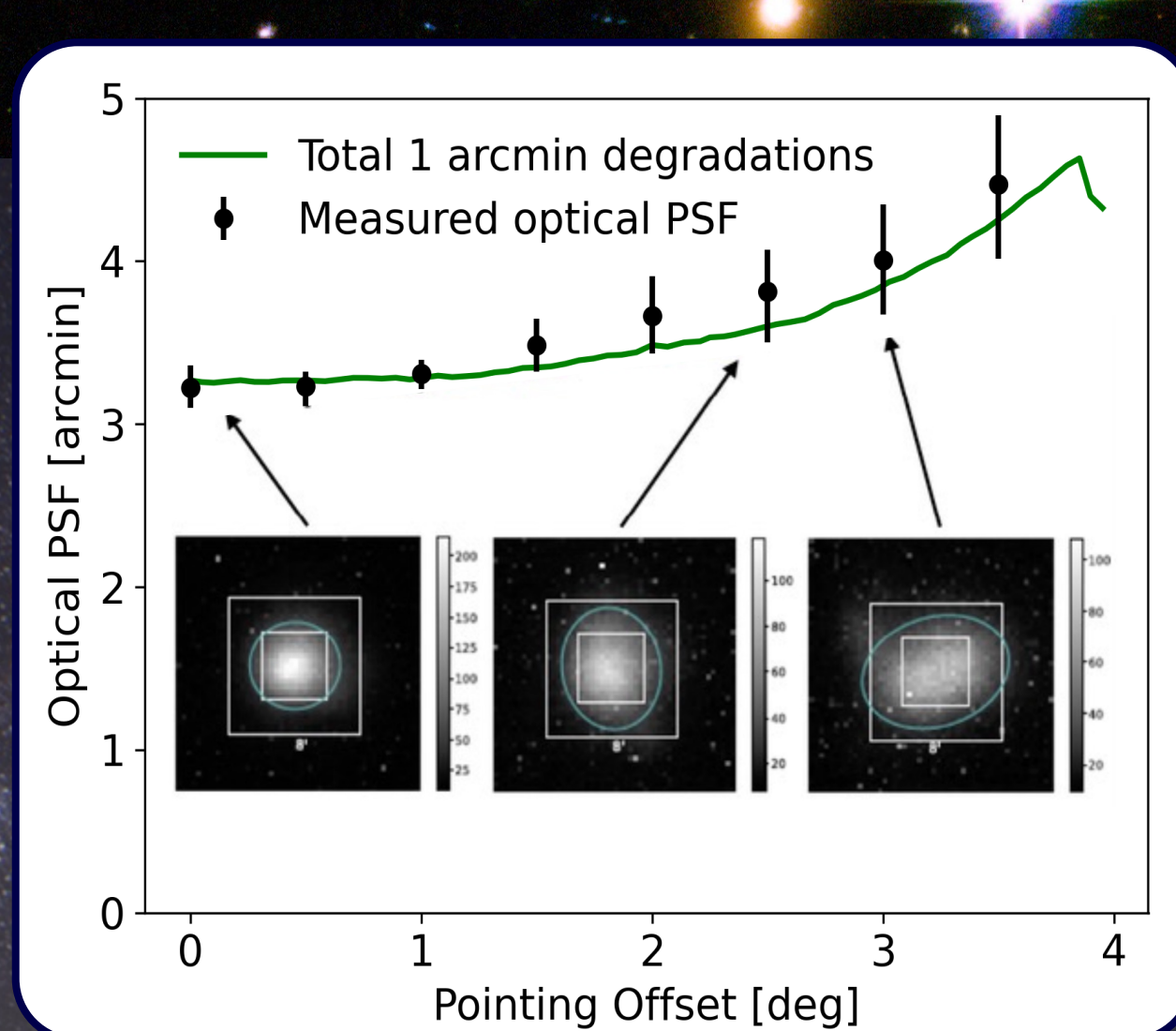


## CTAO Science Theme 3

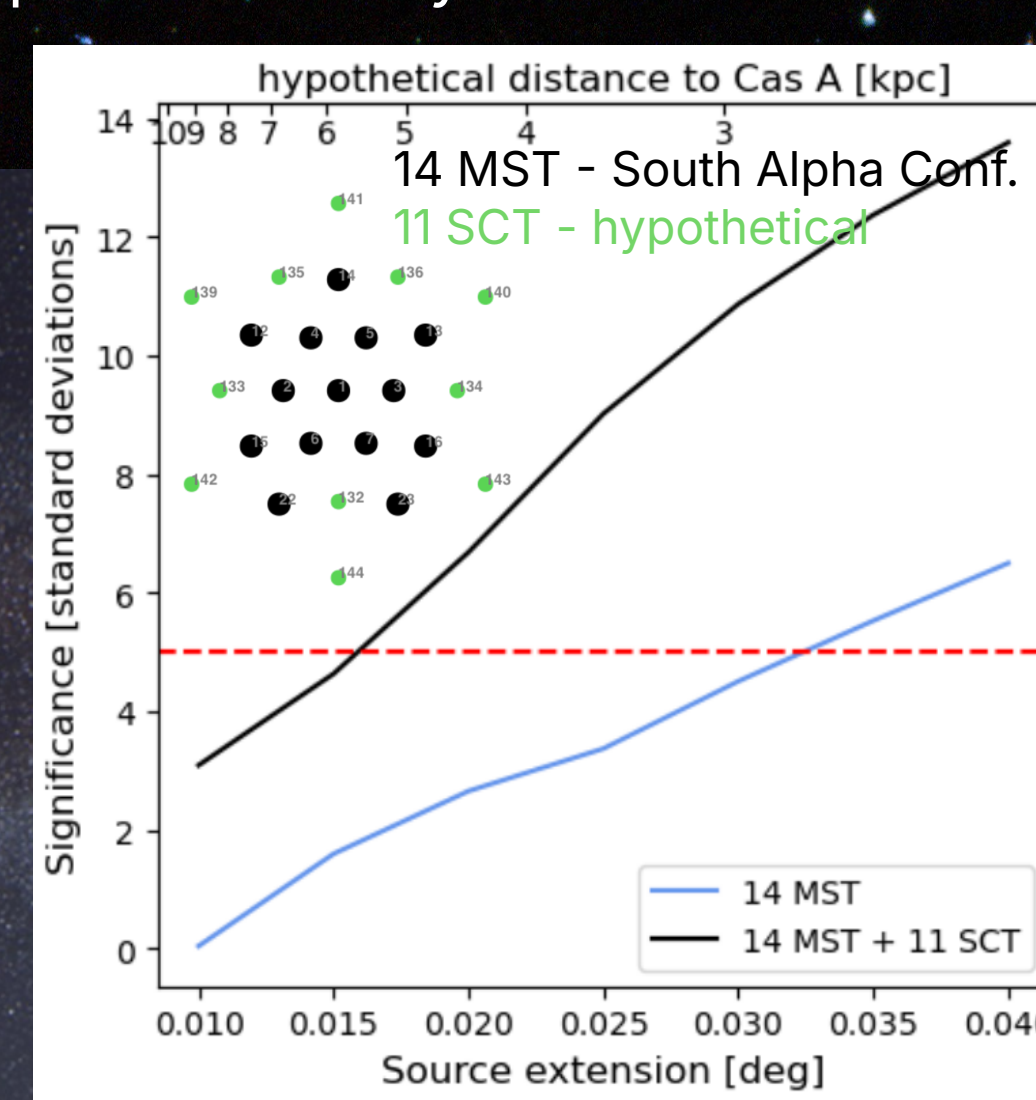
Exploring Frontiers in Physics



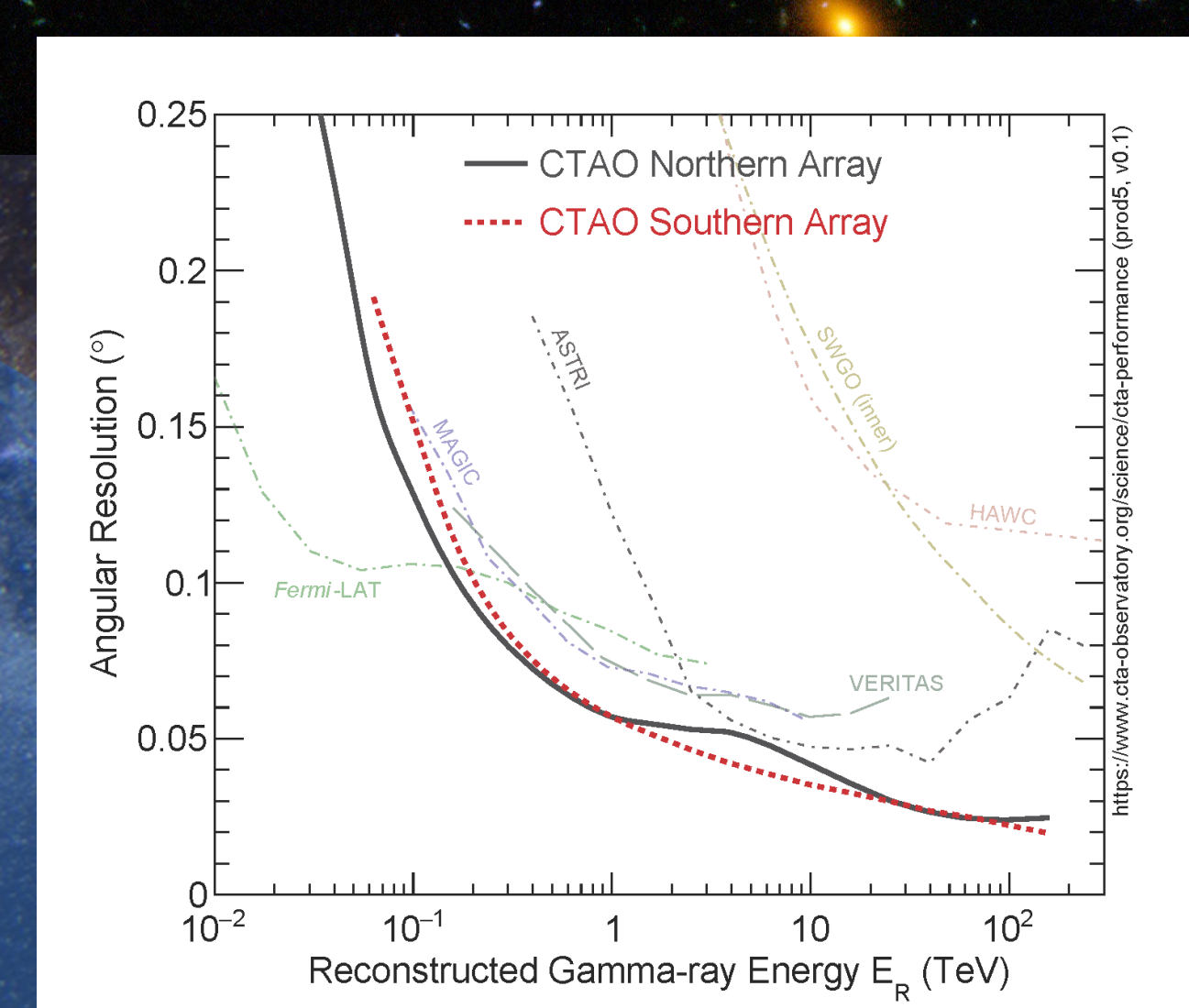
Optical PSF of the Prototype SCT [5]



The addition of 11 SCTs to CTAO will improve its ability to resolve small sources



CTAO gamma-ray angular resolution



## CTAO Science & Performance

- The CTAO will explore a plethora of science opportunities [3]. CTAO LST-1 is already operating and producing excellent science, e.g., the most distant quasar detected at very-high-energies [7].
- The science of CTAO is supported by its high sensitivity, high angular resolution, wide energy coverage, and almost full-sky view from its two sites in both hemispheres.
- The addition of 11 SCTs to the CTAO Alpha configuration will improve its gamma-ray angular resolution and the ability in resolving sources with small extensions.

## ACKNOWLEDGEMENTS

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## References

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