



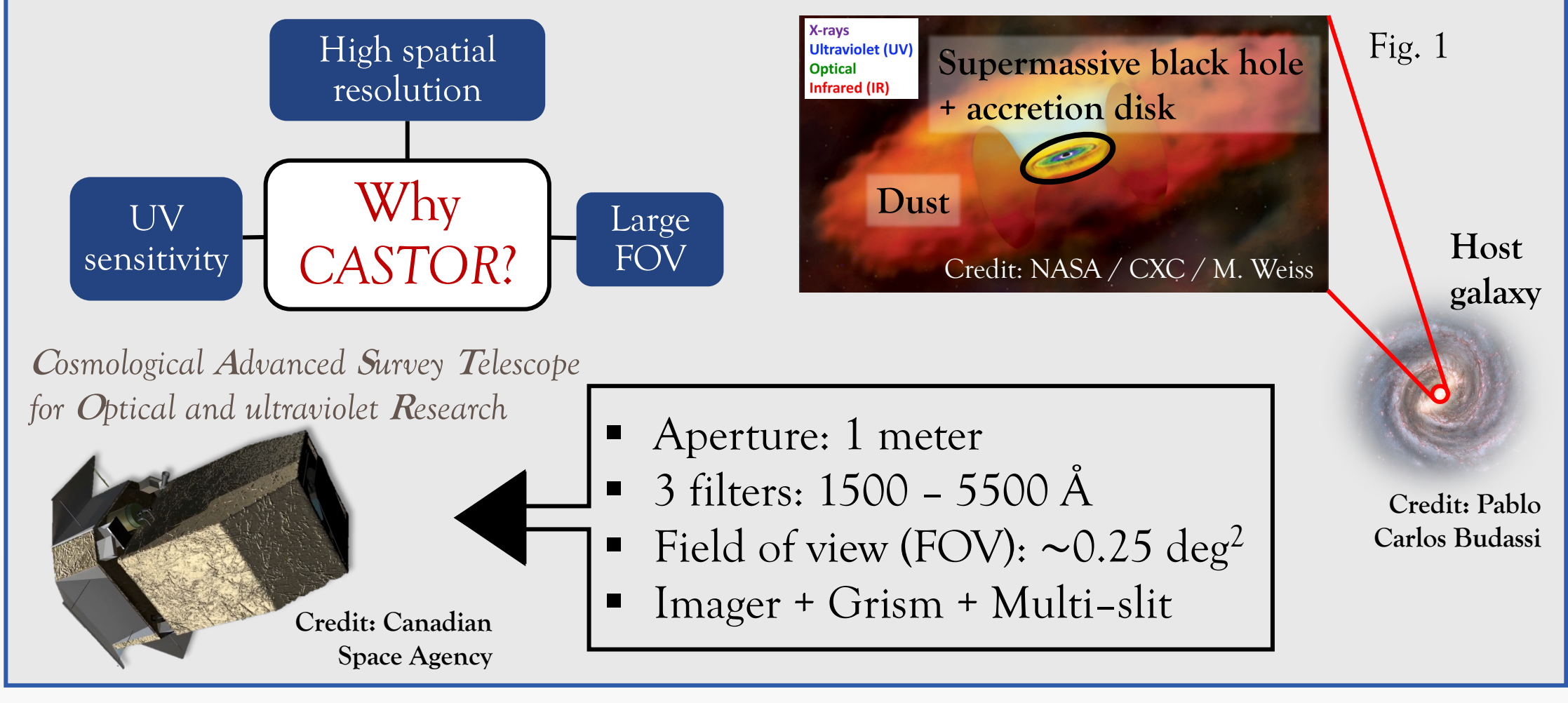
# Active Galactic Nuclei Variability Through the Ultraviolet Lens of CASTOR

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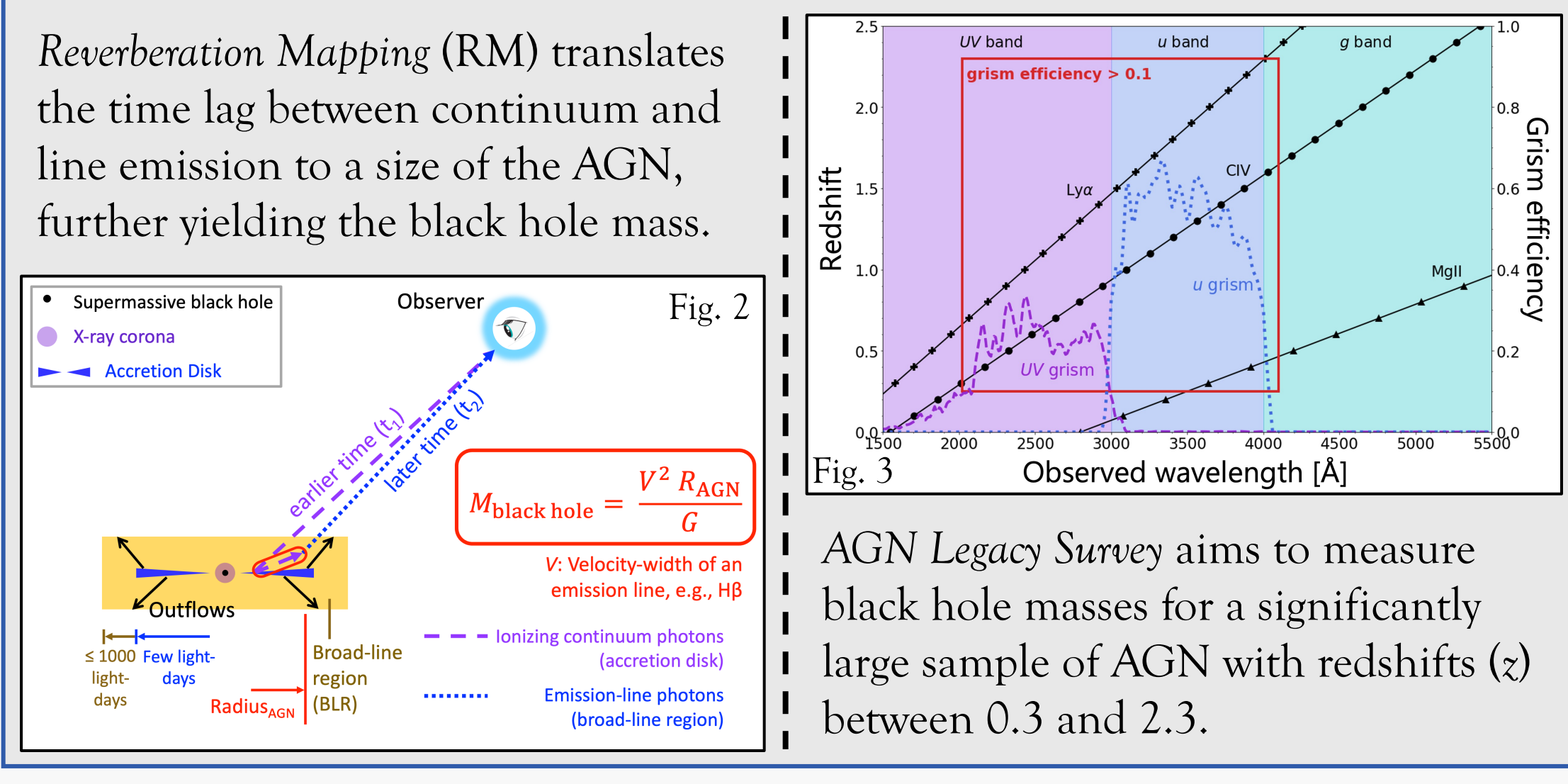
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**CASTOR (P.I.: P. Côté) will use its ultraviolet (UV) vision to look at the heart of active galactic nuclei (AGN) variability.**



**Science Question: How do supermassive black holes grow over cosmic time?**

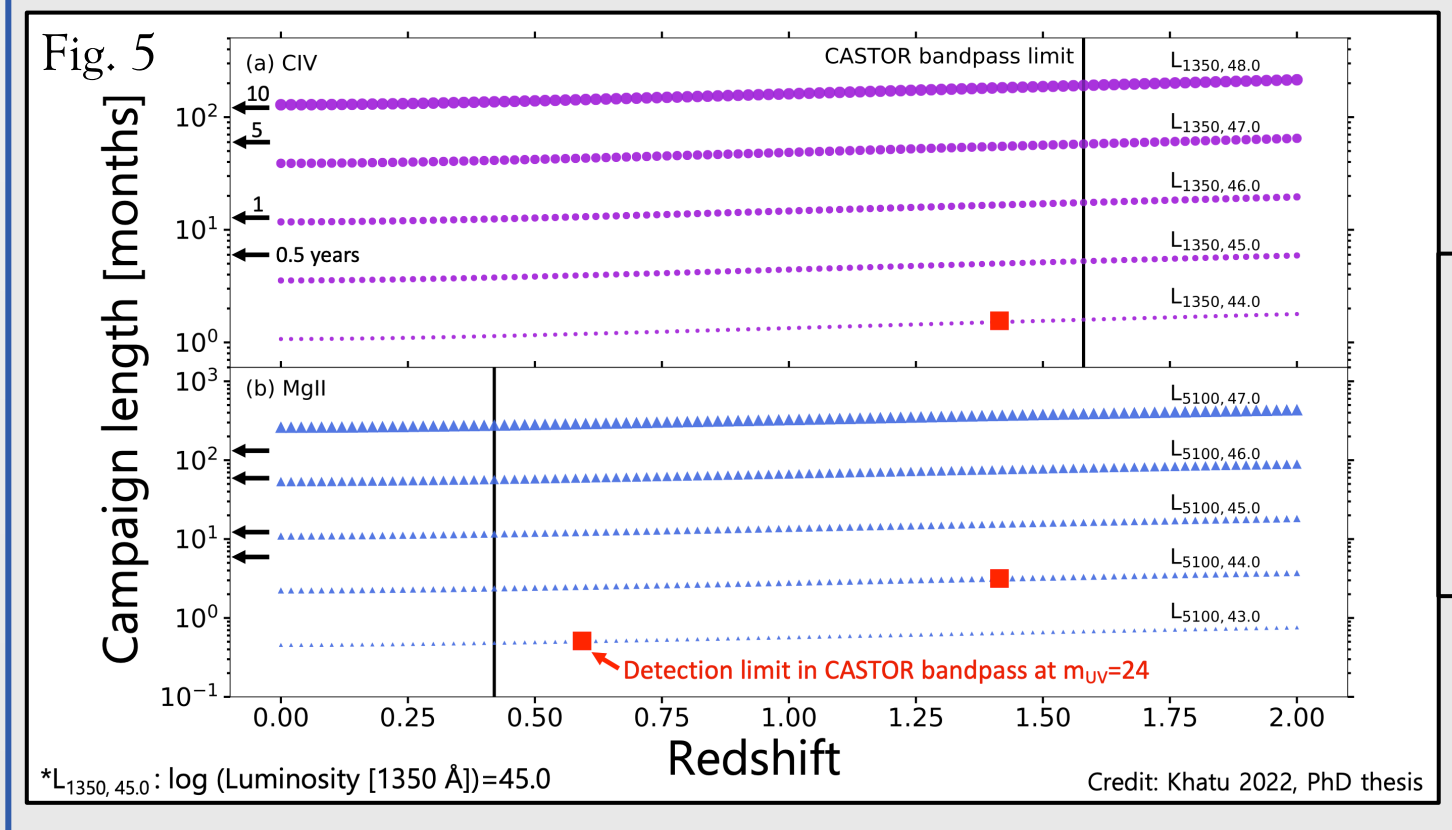
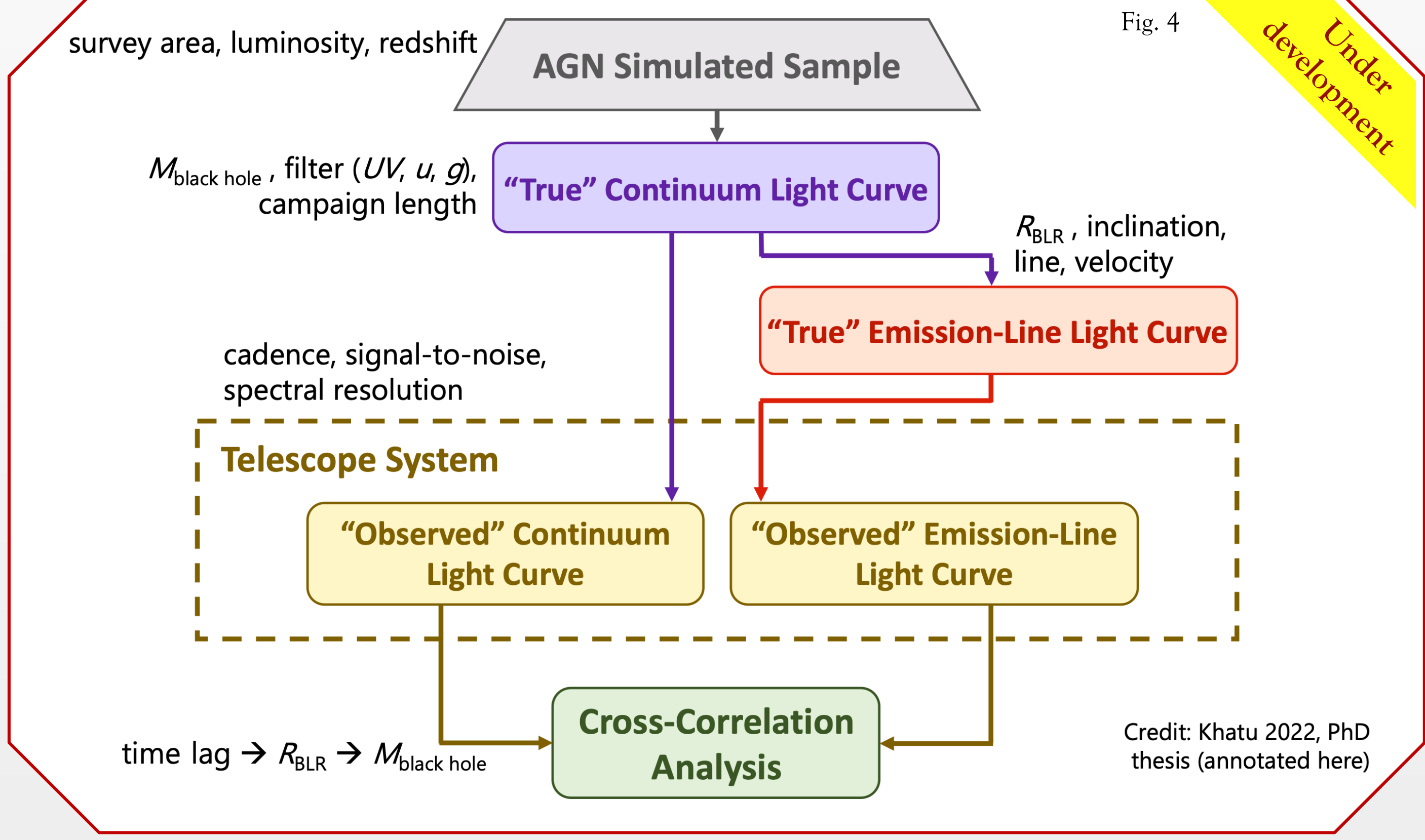


## AGN Survey Simulator

A survey simulation pipeline that optimizes survey observables (e.g., cadence, spectral resolution, sky area, etc.) and suggests the best observing strategy to maximize science returns.

- Modular structure: Each module contains one or more scripts to perform a specific function.
- Uni-directional flow: The outputs of a given module are supplied as inputs for the next one.
- Generic design: Current capability limited to CASTOR, but it can be adapted for other facilities.
- Programmed in Python: User-friendly interface and easy-to-maintain.

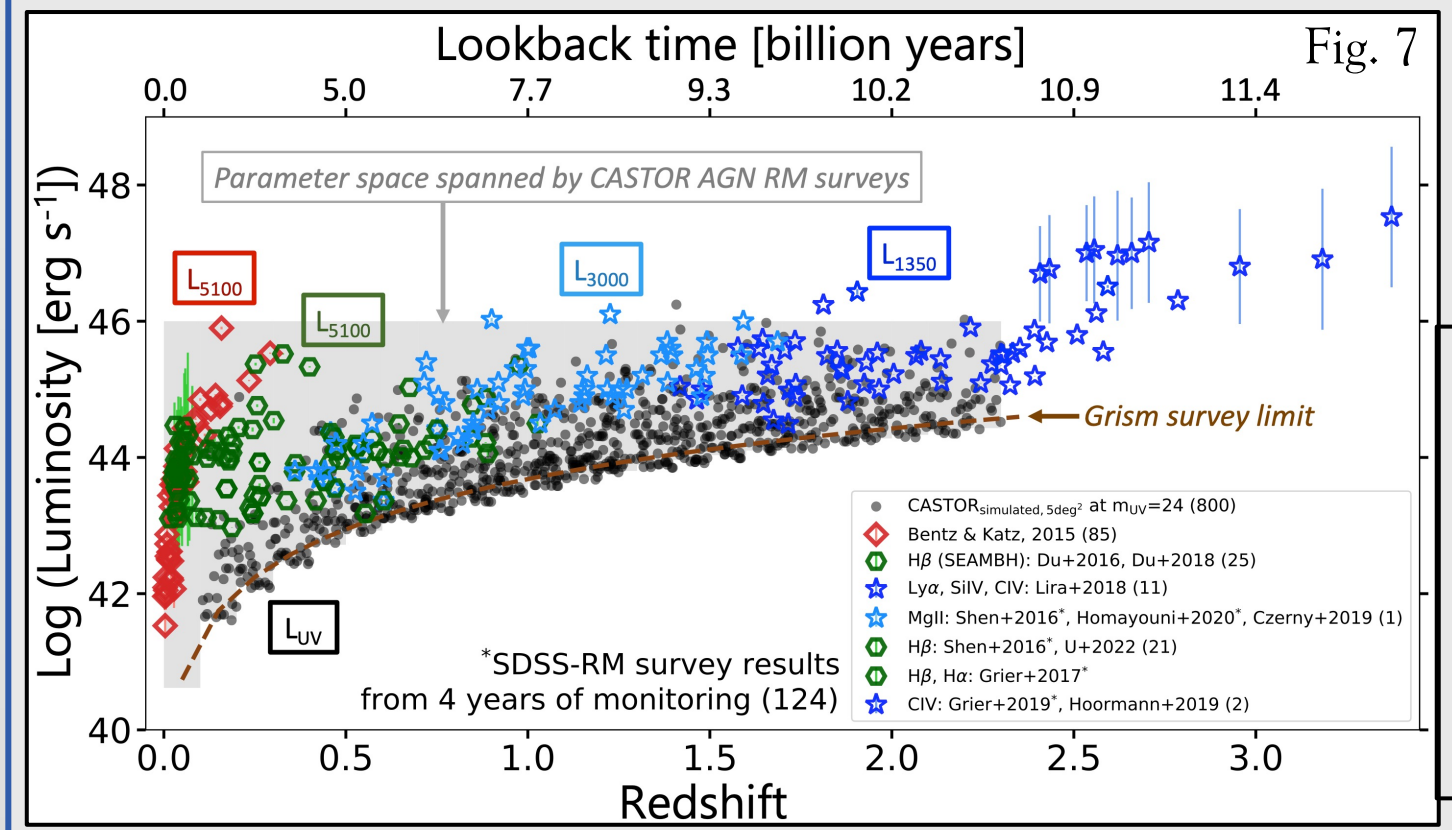
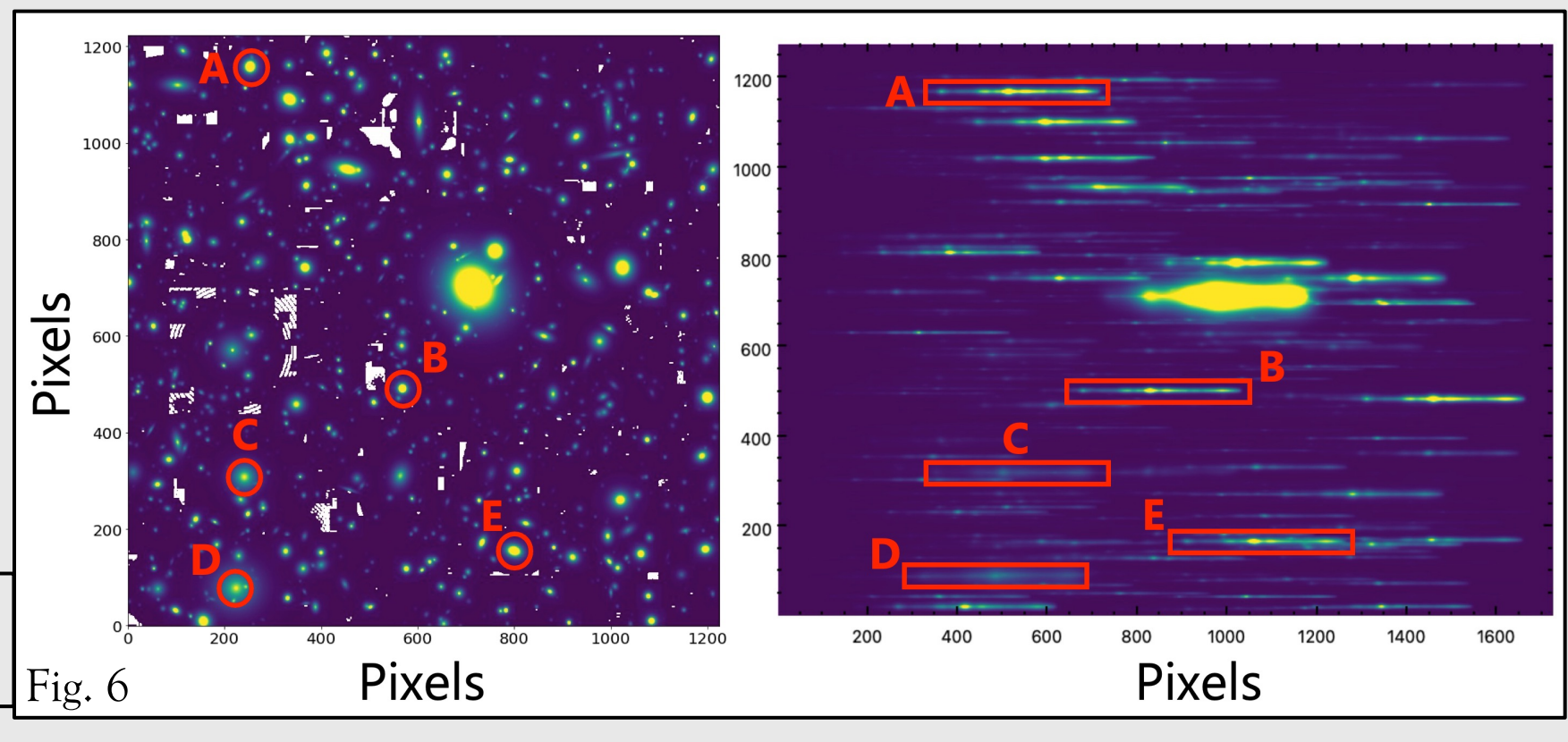
survey area, luminosity, redshift



## Results and Future Work

More luminous high-z AGN need longer campaigns than the less luminous low-z AGN. A nominal 1-year RM campaign will probe AGN up to log(L<sub>1350</sub>) ~ 47.0 and 46.0 in the UV and u bands, respectively, with CIV.

CASTOR grism will produce spectra of every object in the FOV.



CASTOR will explore AGN in a unique, low-luminosity and low- to medium-z parameter space. The simulated sample in a sky area of 5 square degrees (black circles) shows that the CASTOR AGN RM surveys will deliver time-lag measurements for a significantly large sample compared to all previous RM studies.

- Future Work
- 1 Test forward modeling techniques for grism spectral analysis in the low-count regime.
  - 2 Determine methodology for recovering black hole masses using advanced techniques such as independent component analysis.
  - 3 Incorporate analysis with higher spectral resolution data from multi-object spectroscopy.

## Acknowledgements

We thank Dr. Girish Kulkarni (Tata Institute of Fundamental Research, Mumbai, India) for his recommendations on this project.

