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Cosmic Dawn Intensity Mapper: Spacecraft and Mission Design for a Probe-Class Space Telescope

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Very abstract. Much interesting.

Keywords: A list of 3–5 keywords are to be supplied, separated by commas.

1. Introduction

The introduction goes here. Discuss the relevance to NASA, including the science objectives of the mission and how the mission satisfies a Probe class mission. Describe the scope of the paper, including how the design of the spacecraft is driven by the science objectives.

1.1. *Requirements*

Also explain the requirements of a spacecraft that should make these observations, including the spectral and spatial characteristics, sensitivity, and logistics (*i.e.* location, lifetime).

2. Mirror

Recall requirements such as FoV, spectral resolution. Technical requirement of temperature. Based on spectral resolution and FoV, need between 1m-1.5m. Based on cost estimates from Stahl, estimate target diameter, which rersults in target mass.

3. Detector

Recall requirements of spatial resolution, wavelength range, and sensitivity. Technical requirement of temperature. Explain detector type and pixel size that fulfils these.

Multiple detectors are satisfactory, range in TRL, but all are pretty far in development and have been demonstrated in NEOCam, SPHEREx, and JWST.

Using H2RG, need this many which results in this power draw.

4. Thermal Regulation

General approach to cooling with passive and active. Explain tradeoffs between passive and active.

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4.1. *Passive Cooling*

Explain generally how v-groove radiators work. Used on planck and jwst. Desired final temp based on material, setup and location. Area based on general size of telescope. May need to be deployable.

4.2. *Active Cooling*

Detectors use active cooling to bring temp below passive temp. Explain why active needed to manage thermals of detectors. Target temperature and estimated heat dissipation.

Describe types of cryocoolers and the high-level traits/tradeoffs between them. Choose one in particular, but leave wiggle room for others to be chosen. Explain the architecture for implementing this type of cooler, including power draw and mass.

5. Attitude Control

Recall attitude control requirements for science objectives. Briefly explain inertial and propulsive attitude control and the limitations of each.

Acknowledgments

Thanks.

References