

The Explorer of Diffuse Galactic Emission (EDGE)

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1. Summary

The details of the formation of the first objects, stars and galaxies and their subsequent evolution remain a cosmological unknown. Few observational probes of these processes exist. The Cosmic Infrared Background (CIB) originates from this era and measurements of its anisotropy can provide information to test models of both galaxy evolution and the growth of primordial structure. Such measurements should provide a sensitive probe of the large-scale variation in protogalaxy density at redshifts, $z \sim 0.5-3$, while optical galaxy surveys provide complementary information at $z < 0.5$ and Lyman alpha absorption forest studies and Cosmic Microwave Background measurements add information at higher redshifts.

The Explorer of Diffuse Galactic Emission (EDGE) is a balloon-borne mission designed to measure the spatial fluctuations/in the CIB from 200 μm to 1 mm on $6'$ to 3° scales with up to $2\mu\text{K}$ sensitivity/resolution element on an Antarctic Long Duration Balloon (LDB) flight. EDGE will employ an array of Frequency Selective Bolometers (Kowitt et al., 1996) to simultaneously measure spectral and spatial information with seven sky pixels each containing eight spectral bands. EDGE is designed to cover ~ 100 square degrees of the sky in a single ~ 10 day LDB flight to create a new observational constraint for large-scale structure formation theories.

References

Kowitt, M. S., Fixsen, D. J., Goldin, A., & Meyer, S. S., 1996, *Appl. Optics*, 35, 5630