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DIFFRACTION EXPERIEMENT, LAB 1 AST2210

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ABSTRACT

In this project we are looking at some aspects of diffraction through a single slit, an anti-slit and an Airy disc experiment. Our goal is to calculate the wavelength of a red laser using the diffraction pattern produced in the single slit experiment, where we found the wavelength to be $\lambda = 650\,\mathrm{nm}$. Then we use our result to find the width of an anti-slit,

State problem. Briefly describe method and data. Summarize main results.

In this paper we want to look at some aspects of diffraction, and its consequence for the James Webb Space Telescope. We will through a single slit diffraction pattern manage to calculate the wave length of a red laser to be $\lambda = 641 \pm 12.29$ nm. Through Babinet's principle we will be able to calculate the width of a paper clip, by looking at the diffraction pattern it makes. Lastly we will picture a Airy disc, and use this to calculate $K = 0.71 \pm 0.475$, and using this to find the angular resolution of the James Webb Space Telescope to be $\theta_{min} = 7.514 \cdot 10^{-8} \pm 5.027 \cdot 10^{-8}$.

Subject headings: cosmic microwave background — cosmology: observations — methods: statistical

TABLE 1

Column 1	Column 2	Column 3	Column 4
Item 1	Item 2	Item 3	Item 4

Note. — Summary of main results.

1. INTRODUCTION

Discuss background, physical importance and possibly some history of the problem that is being studied in this paper.

2. METHOD

Describe method. Define data model and likelihood. Outline how the likelihood was computed (grid or MCMC).

Define the power law model in terms of Q and n.

3. DATA

Summarize properties of data. Which data are used (experiment, frequencies etc.)? Pixel resolution (N_{side}), ℓ_{max} – everything necessary to repeat the analysis for other researchers.

Show a sky map of the smoothed data. Use the Healpix routine "smoothing" to do this; it works just like anafast. Smooth with a 7° beam, and plot with "map2gif". Show the RMS pattern as well.

4. RESULTS

Show the 2D likelihood contours. Summarize constraints on Q and n.

5. CONCLUSIONS

Summarize results. Discuss their importance, referring to the discovery to the initial seeds for structure formation. Mention that these results are in good agreement with expectations from inflationary theory.

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REFERENCES

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