INTRODUCTION

New small and large aperture telescopes are being built to observe the Cosmic Microwave Background from the Atacama desert in Chile. We compare multiple techniques for creating observing strategies for these telescopes, with a particular focus on Simons Observatory. We design strategies with the Simons Large Aperture Telescope (LAT) and Small Aperture Telescope (SAT) specifically in mind.

SCHEDULE GOALS

The large aperture strategy seeks to observe a large sky area. We assume an 8° FoV. The small aperture strategy, with a 35° FoV, observes a smaller sky area to improve depth. In both strategies it is beneficial to maintain even coverage of fields, to aid in analysis. We also try to avoid observing regions with high foregrounds, to maximize observing efficiency, and to observe at many elevations to reduce systematics.

ACKNOWLEDGEMENTS

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REFERENCES

1. Simons Observatory https://simonsobservatory.org
2. Galitzki et al, SPIE 2018, 10708-3

SUN AND MOON AVOIDANCE

Avoiding observing near the sun and moon reduces sidelobe power into the telescope. We avoid observing the sun or moon within 30° (LAT) or 45° (SAT).

The classical strategy takes advantage of the multiple strategy cycle to avoid the sun and moon by switching to a “complementary” strategy. Any time the sun or moon are still in the exclusion region is cut from the schedule.

CLASSICAL AND OPPORTUNISTIC

The “classical strategies” are designed by similar methods to Advanced ACTPol’s night strategy [3]. Fields are observed rising or setting, at one of three elevations, and possibly prioritizing certain fields. The combinations of strategies are cycled through, changing strategies each day.

We have developed a new kind of opportunistic scheduler that tiles the desired fields and prioritizes observations of each tile based on desired criteria. The observing constraints and FoM for prioritization can be adjusted. In the field, the priority could be adjusted dynamically, taking past observations into account.

FUTURE WORK

Important next steps include determining how these schedules impact cosmological constrains. We will also implement schedules that include boresight rotation.