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Optical System Development for Balloon-Borne Sodium Lidar KATHERINE LEE, Montana State University, Bozeman, MICHAEL KRAINAK[1], NASA Goddard Space Flight Center — The mesosphere and lower thermosphere region is a relatively understudied section of the Earths atmosphere, and could provide beneficial data for tracking atmospheric dynamics and weather. To that end, a balloon-borne sodium lidar system is proposed, using a 589-nm frequency doubled Raman laser. This laser must be Q-switched at a frequency of around 10 kHz, but this frequency presents ambiguity problems: with such a high pulse frequency, it is impossible to distinguish fluorescence from a sodium atom that is far away but excited earlier, from that of a sodium atom that was excited later, but is situated closer to the detector. In order to counteract this issue, an apparatus is proposed using a quickly rotating mirror to create seven beams from one laser, arranged in a hexagonal configuration and each pulsing at 1.428 kHz, a low enough frequency to negate ambiguity. Although further testing is needed, preliminary results suggest this to be a feasible solution.

[1]Currently employed at Relative Dynamics, Inc., not at NASA GSFC; however, the project was conducted entirely at NASA GSFC.

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