



## **Polarization remote sensing of the atmosphere**

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### **ABSTRACT**

The blue light we see in the sky is a result of molecular scattering ("Rayleigh scattering"), which also leads to strongly polarized light in a region located approximately 90 degrees from the Sun. At Montana State University we designed and built several all-sky polarization imagers to study the spatial, temporal, and spectral distribution of skylight polarization. We also are designing nano-engineered optical devices that can be used to build an imaging system with pixels that simultaneously filter the incident light by wavelength and polarization state. These devices will operate at wavelengths in the range of 1500-1800 nm for remote sensing of cloud thermodynamic phase (i.e., to determine if the clouds contain ice or liquid water). This talk will describe and show all-sky polarization images under different conditions that include clear and cloudy skies in day and night - as well as a clear sky during the total solar eclipse of 21 August 2017 - and will briefly describe the nano-engineered optical elements and their intended use for cloud phase remote sensing.