Poster Abstract Submission Confirmation

Thank you. This is a confirmation that your abstract has been submitted successfully.

An email confirming the receipt of your abstract has been sent to you and the presenting author(s).

Please review your abstract information displayed below to make sure it is complete and correct. Update this Abstract if you need to make changes.

Low-cost miniaturized laser heterodyne radiometer for highly sensitive detection of CO2 and CH4 in the atmospheric column.

Emily L Wilson, NASA GSFC, Emily.L.Wilson@nasa.gov (Presenter)
Matthew L McLinden, NASA GSFC, matthew.l.mclinden@nasa.gov
J Houston Miller, GWU, houston@gwu.edu

We present a new passive ground-network instrument capable of measuring carbon dioxide (CO2) at 1.57 microns and methane (CH4) at 1.62 microns – key for validation of OCO-2, ASCENDS, OCO-3, and GOSAT. Designed to piggy-back on an AERONET sun tracker (AERONET is a global network of more than 450 aerosol sensing instruments), this instrument could be rapidly deployed into the established AERONET network of ground sensors. Because aerosols induce a radiative effect that influences terrestrial carbon exchange, this simultaneous measure of aerosols and carbon cycle gases offers a uniquely comprehensive approach. This instrument is a variation of a laser heterodyne radiometer (LHR) that leverages recent advances in telecommunications lasers to miniaturize the instrument (the current version fits in a carry-on suitcase). In this technique, sunlight that has undergone absorption by the trace gas is mixed with laser light at a frequency matched to a trace gas absorption feature in the infrared (IR). Mixing results in a beat signal in the RF (radio frequency) region that can be related to the atmospheric concentration. By dividing this RF signal into a filter bank, concentrations at different altitudes can be resolved. For a one second integration, we estimate column sensitivities of 0.1 ppmv for CO2, and <1 ppbv for CH4.