SLAC COLLOQUIUM SERIES

The Radiative Drivers of Climate Change: Known Knowns and Known Unknowns

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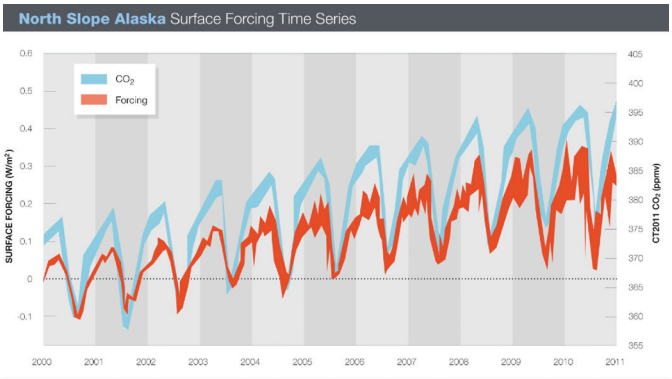

Abstract:
We present four new findings regarding the state of knowledge and remaining uncertainties concerning the anthropogenic agents of climate change. These agents include the long-lived greenhouse gases such as carbon dioxide and the short-lived climate forcers including methane and aerosols. First, using modern laboratory spectroscopy we show that we can calculate the radiative forcing by carbon dioxide to sub-percent relative accuracies despite claims to the contrary by some prominent members of the physics community. Second, we show that these calculations are verified by the first-ever measured time series of the CO2 greenhouse effect, confirming both its expected rate of increase and its prediction by climate models. Third, we present novel observed time series of the greenhouse effect of methane and global calculations of its heating of the climate system by absorbing sunlight, confirming the importance of methane as a target for near-term climate mitigation efforts. Fourth, we present initial results from a new experimental protocol to reduce the significant uncertainties in the radiative forcing by anthropogenic aerosols. This protocol will be an integral part of the upcoming Sixth Assessment by the Intergovernmental Panel on Climate Change.

April 2, 2018, Kavli Auditorium, Refreshments and Colloquium Start at 3:45pm