



SPEAKER: Hamish Gordon (CERN)
TITLE: **The CLOUD experiment at CERN**
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PLACE: Salle Anderson

ABSTRACT

The CLOUD experiment investigates the formation of new aerosol particles in the atmosphere via nucleation of trace gas molecules. The particular focus is on the effect of ions from cosmic rays on this process. Since starting operation, CLOUD has made a substantial contribution to our understanding of particle formation in the atmosphere during ten experimental runs, each lasting a few months. Atmospheric aerosol particles and aerosol-cloud interactions play a major role in regulating Earth's radiative balance, and thus the results obtained by CLOUD have potential to help us understand past and future changes in climate.

The experiment consists of a chamber facility at CERN that hosts state-of-the-art gas and aerosol analysis instruments from collaborating institutes. The chamber is the world's cleanest laboratory for studies of atmospheric particle formation, and has unique capabilities for replicating atmospheric ion concentrations via the PS beam. Its design and construction also allow regulation of temperatures within the chamber to achieve a stability of around 0.01K and uniformity of a few times 0.1K, while permitting experiments at temperatures as low as -65°C . The atmospheric photolysis of ozone is replicated with a UV laser system (new in 2015) for the homogeneous, in-situ generation of the precursor gases for nucleation. After an introduction to the experiment and the scientific motivation, an overview of how key challenges in constructing the facility and running experiments in the chamber will be given. Recent developments that enable more sophisticated and diverse research, for example into the chemical reactions in cloud droplets will be described.

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