**Assembly & Characterization of a Measurement System
for Size-Resolved CCN Spectra**

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Objective

Those particles in the atmosphere that have the potential to become cloud droplets are called cloud condensation nuclei, or CCN. Whether a particle acts as a CCN is a complex function of the atmospheric saturation level and the particle's size and composition. Predicting the cloud-forming potential of an aerosol population requires understanding how these properties interact, but obtaining the necessary data to allow such understanding is a challenge

The recent commercialization of an improved instrument for measuring CCN has resulted in new measurement strategies for probing how particles' size and chemistry affect their cloud-forming potential. One such approach is to use a differential mobility analyzer (DMA) to classify particles by size before they are sampled by a CCN counter in parallel with a total particle counter. A few recent studies have employed this technique with promising results, but its effectiveness and power have yet to be fully characterized. The goal of this project is to assemble a measurement system of this type and demonstrate its usefulness for probing the cloud-forming potential of laboratory-generated particles.

Preliminary Training

This project will involve assembling a new measurement system from existing instruments in the mentor's laboratory. This will require a depth of understanding of the measurement techniques beyond what would be required in other measurement projects. Some time at the start of the project will be devoted to understanding the operating principles for the various particle instruments.

Assembling the new system will also require the development of control software. The LabView development language will be used for this purpose. The program has a very steep learning curve; while the student will not be expected to develop the control program independently, an understanding of how the code works will be very advantageous for the overall effort. Significant time at the start of the project will be devoted to learning LabView via tutorials and sample programs.