INTERCOMPARISON OF PARTICLE NUMBER SIZE SPECTROMETERS

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Introduction
The measurement of particle number size distributions is one of the most important tasks describing the physical properties of aerosol particles. Up to now there is no standard to compare those systems for particle sizing and counting efficiency. A comparison of DMPS/SMPS systems is very difficult since most of the systems are home-made and based on different types of DMAs, CPCs, and programming languages. In this work, that is part of the NORPAC network project (http://NORPAC.smu.dk), an intercomparison unit is introduced to compare DMPS/SMPS systems located at different measurement sites in sizing and counting efficiency.

Methods
Our main goal is to compare DMPS/SMPS systems without moving those. Therefore, an intercomparison unit has been provided that can be sent around to different groups participating in the intercomparison. The unit is introduced to compare DMPS/SMPS systems located at different measurement sites in sizing and counting efficiency.

Results
On the left, a typical size distribution of Dp = 277nm spheres is shown. Singly and doubly charged particles can easily be identified by the main peaks. Up to now, the intercomparison unit has been tested for four different measurement devices and the sizing has been compared. First results show a systematic underestimation of the tested systems for particles of smaller sizes (Dp = 101, 277nm ~ 1–3%) and a systematic overestimation for particles of larger sizes (Dp = 420nm ~ 4%). However, variation for sizing within the four tested systems is relatively small with +/- 2%.

Outlook
In the future several groups within the Nordic countries continuously operating DMPS or SMPS systems will participate in the intercomparison experiment. The systems will be compared for sizing and counting efficiency.

Participation
Groups that are interested in our intercomparison experiment are kindly welcome to participate.

Figure 1: Schematic sketch of a DMPS/SMPS system.

Figure 2: Schematic sketch of the intercomparison unit (sizing).

Figure 3: Schematic sketch of the intercomparison unit (counting efficiency).

Figure 4: Size calibration (Dp = 277nm).

Figure 5: Comparison in sizing for different DMPS/SMPS systems.