

## **Obtaining the Diameter Growth Rate and Particle Current during Nucleation and Growth Periods from Measurements of Charge Distributions and Aerosol Size Distributions**

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Measurements of + & - charged fractions (3.5-25 nm), size distributions of positive and negative ions (0.4-6.3 nm), and total (charged+neutral) particles (3 nm-5 mm) were performed north of Mexico City during year 2006 MIRAGRO campaign. Fuchs surface areas and the ultrafine particle concentrations were higher than we've observed elsewhere. It was difficult to obtain the diameter growth rate, GR, from the measured particle size distribution since the growth of modal sizes was not clearly visible. Therefore, GR was estimated from the measured charged fraction,  $f$ , in the 3.5-15.5nm range assuming that the measured profile of  $f$  vs size can be characterized by the steady state charge distribution undergoing condensational growth and ion-aerosol attachments. This assumption is valid for these measurement conditions. For measurements where we were able to accurately determine modal growth rates, GR inferred from the steady-state assumption agreed reasonably well with the observed modal growth rates. The estimated particle current at 4.3nm and 1nm for a typically observed nucleation event (3/21/06) are  $\sim 300$  and  $\sim 1800$   $\text{cm}^{-3}\text{s}^{-1}$ , respectively, indicating that particle formation rate in the atmospheric boundary layer of Mexico City is unusually high.