PM2.5 System

It’s not just the lens!
PM2.5 lens and capture vaporizer as a package

PM2.5 delivery

Transmission efficiency

CPC/ Grimm

Light Scattering detection

Aerodynamic Particle Focusing Lens
Particle Beam TOF Chopper

Turbo Pump

Collection efficiency

MS/pToF

http://cires.colorado.edu/~jjose/ams.html
Requirements for PM2.5 Instrument

- Get the particles to the lens
  - Inlet plumbing
- Get the particles through the lens
  - PM2.5 Lens
- Detect the particle mass
  - Capture Vaporizer
Old Inlet Style
ACSM Inlet for PM2.5

- Switch to straight path for filter valve
- Eliminate bends in 1/8” tube
- Minimize length of 1/8” Tube

Loss in 1/8” Tube

![Graph showing particle loss comparison between new and old designs.]

- New Design: 3.8% at 2.5 µm
- Old Design: 21% at 2.5 µm
Multiple copies show similar transmission on large side
Measurements using polydisperse/detuned DMA particles
More and better measurements for the small side to come
Performance of Capture Vaporizer

![Graph showing collection efficiency (PTOF/LS) vs Da (nm) for NaNO$_3$ PTOF counts/LS Counts with Capture Vaporizer. The graph compares two runs: Run 1 (blue triangles) and Run 2 (red triangles).]
Fragmentation pattern change toward more thermal decomposition

![Graph showing fragmentation pattern change]

Species
- Nitrate $5.11 \times 10^4$
- Others $7.02 \times 10^5$

Species
- Nitrate $2.44 \times 10^4$
- Others $6.46 \times 10^5$