HP Lens

- Lens for larger particles: up to 2.5 μm
- Increased pressure inside the lens: 13 Torr
- Apertures smaller as in Standard Lens
- Different orifice mounting and valve (all same diameter)

Results from Jenny January 2007

- Red data points from previous lens characterization
- Black data points correspond to lens set for maximum intensity at 300 nm NaNO₃
- Blue data points correspond to lens set for maximum intensity at 650 nm NaNO₃
- Green data points correspond to lens set for maximum intensity at 900 nm NaNO₃
- Able to increase TE of large particles by realigning the lens
Setup for Spot Measurements

• Collected spots from polydisperse and monodisperse NH₄NO₃ aerosol
• Turned different parts from the different lenses

Photographs of the Collecting Spots

• Polydisperse Spots with different HP lens (NH₄NO₃, 15 sec)

Lens0  Lens1  Lens2  Lens3
**Lens3, monodisperse, NH$_4$NO$_3$**

- Lens is focusing particles of a certain size
- Focal beam axis is shifted for different sizes
- Not all sizes collectible at same lens position

**Lens3, turned whole lens**

Spot turns and spot center moves
Lens3, turned part A

Influence of direction of part A visible

Lens3, turned part B

Influence of direction of part B larger than for part A
Lens3, turned one part to 90°

Influence of direction for part B largest

Influence of lens pressure, Lens2

• 13.5 Torr inside the lens corresponds to ambient
• Increasing pressure shifts transmission to larger particles sizes
• Decreasing pressure shifts transmission to smaller particle sizes
Lens alignment experiments, Lens 2

- Alignment of lens for different size particles for vaporizer (MS) and for light scattering (LS)

- Shape of the spot and centers of alignment agree qualitatively

TE measurement for Lens2

- Lens position fix at “measuring point”

Good agreement for larger particles, more experiments for smaller particles
Summary

• Collected particles dependent on lens position
• Visualization experiments opened eyes:
  – Direction of the different parts of a lens influences the spot
  – Machining tolerances critical
• Found “good” position with alignment experiments for Lens2
• TE measurement agrees for large particles, more experiments for small particles have to be performed