

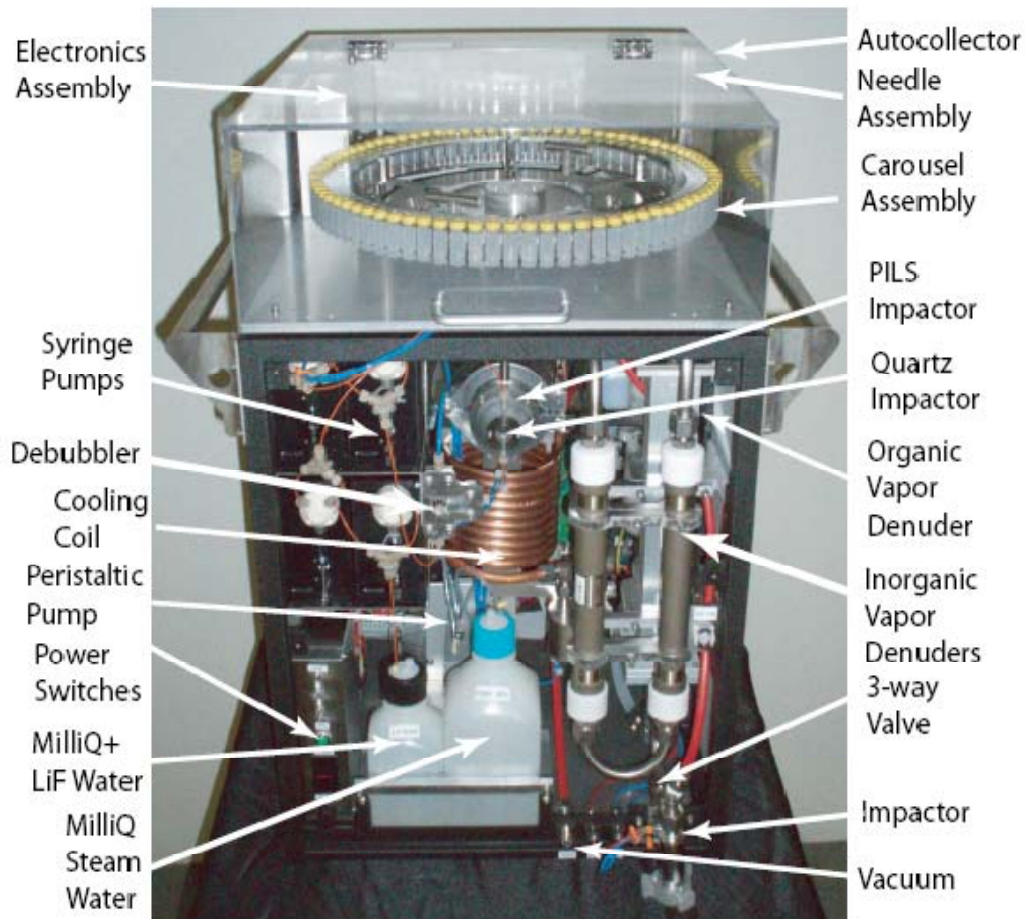
Fine Aerosol Composition Measurements during SOOT

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MOTIVATION

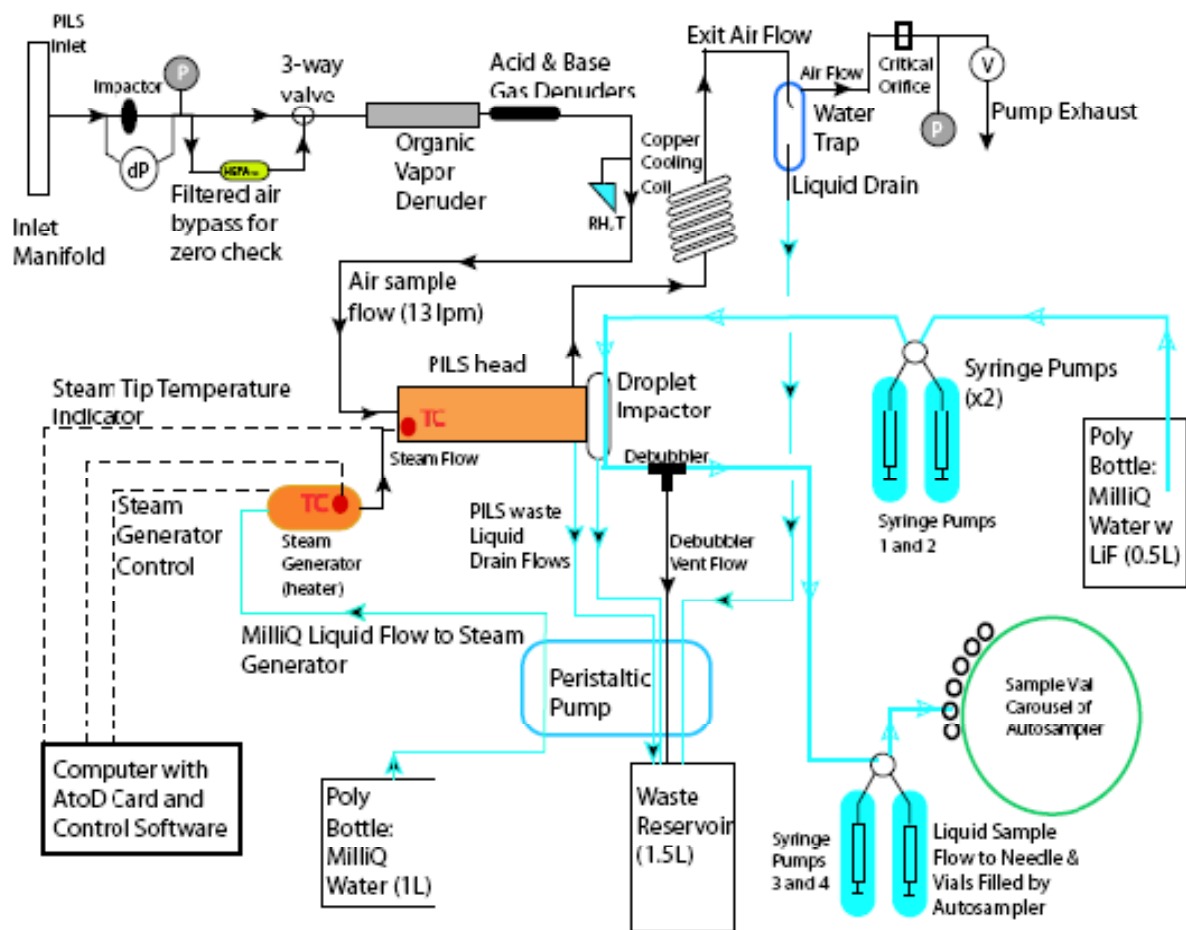
- TERC Strategic Research Plan indicates, “secondary PM, including secondary organic aerosol (SOA) formation, is an important contributor to the total PM problem.”
- Measurements of fine aerosol composition will support the successful implementation of one of the two “pressing needs” highlighted in the SRP: the incorporation of “multi-phase radical chemistry and enhanced sources of new radicals in air quality models.”
- The rate of heterogeneous HONO formation will likely depend on the fine PM composition; identifying these dependencies will improve the accuracy of the forthcoming model improvements.

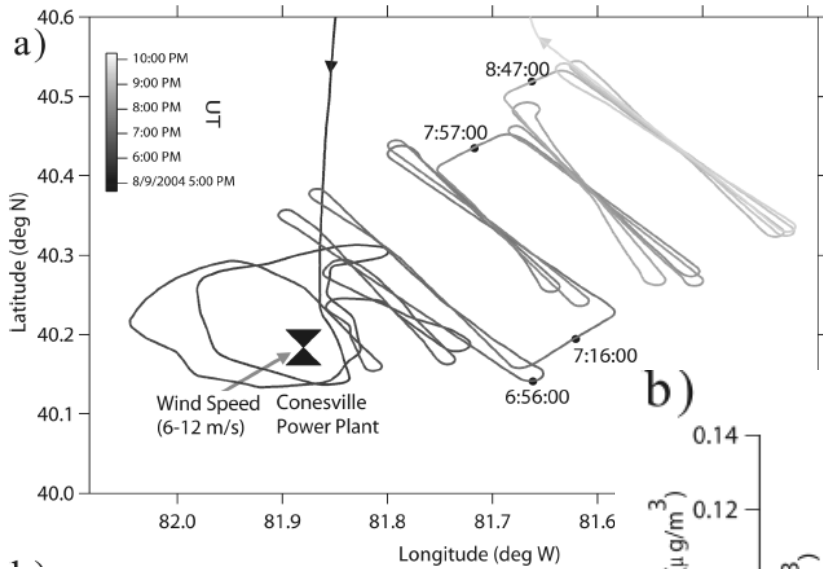
Approach: Fine PM Composition Using PILS



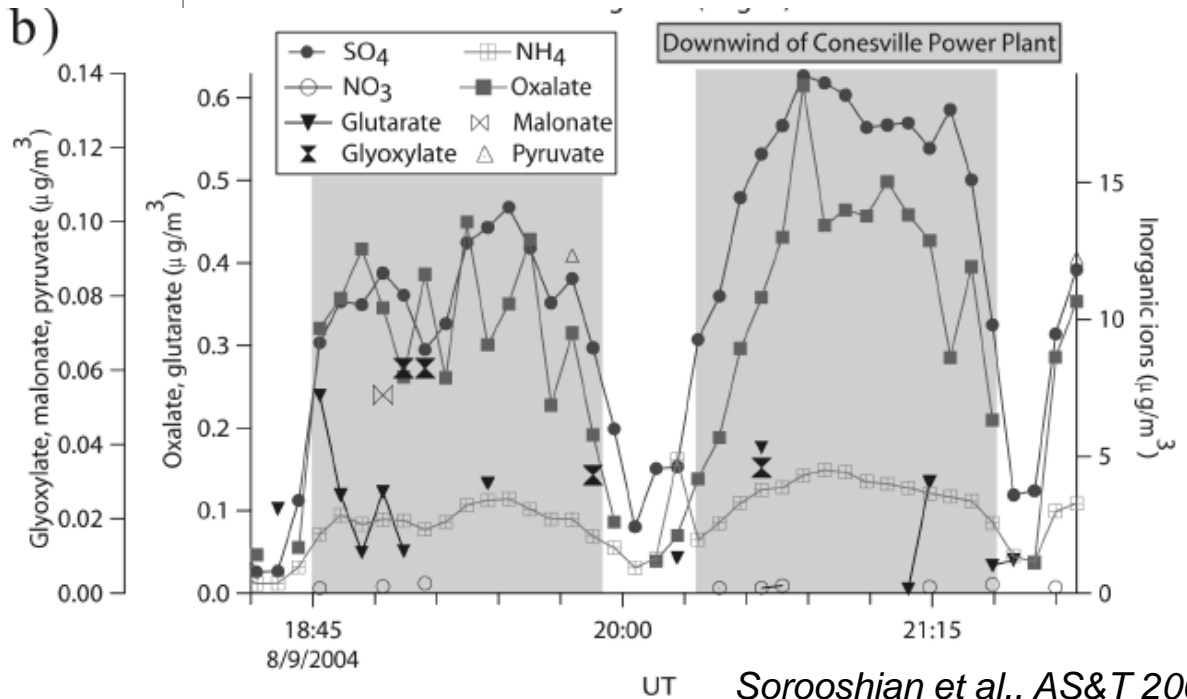
- Collects water soluble aerosol fraction in solution for later laboratory analysis.
- ~20 min Sampling Period per vial.
- Choice of PM_{2.5} or PM_{1.0} preimpactor.
- Analysis by ion chromatography for inorganic and major organic ions.
- Analysis using a Total Organic Carbon instrument for aerosol water soluble organic content.

PILS Schematic





Aerosol Evolution in Power Plant Plumes



Sorooshian et al., AS&T 2006

SUMMARY

- Further characterization of fine particulate material in the Houston will facilitate a more complete understanding of the contributions of secondary material and particularly SOA to PM_{2.5}, a research priority highlighted in TERC Strategic Research Plan.
- The coordination of these PM composition field measurements with the proposed SOOT experiment will provide information about the dependence of heterogeneous HONO formation on particle composition.
- These results can be incorporated into new models of these important heterogeneous processes, allowing for more accurate predictions of air quality in the Houston metropolitan area.