INDIVIDUAL NANOPARTICLE SIZE and COMPOSITION by REAL-TIME MASS-SPECTROSCOPY
and
THERMODYNAMICS and KINETICS on the NANOSCALE

Dan Imre

Alla Zelenyuk	BNL	Peter Imrich	SUNYSB
Tim Onasch	BNL	Ray Mugno	SUNYSB
Jeong-Ho Han	BNL	Wei Zhu	SUNYSB
Logan Chieffo	SHU	Klaus Muller	SUNYSB
Robert McGraw	BNL	Susan Oatis	SHU
Barbara Hillary	SUNYOW	Mike Alexander	PNNL

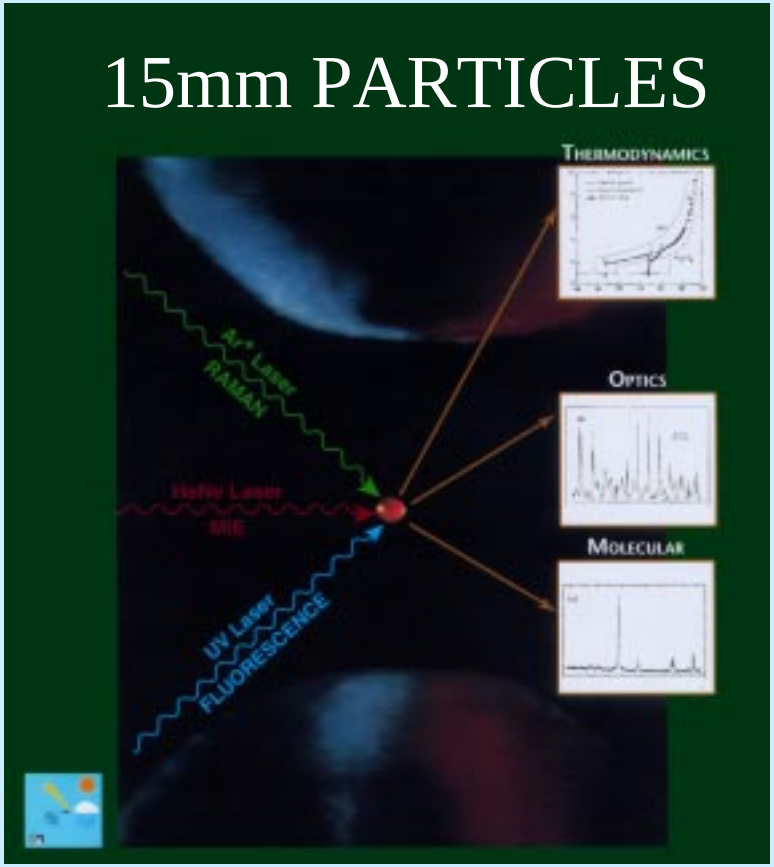
WHERE WE WERE ~2.5YEARS AGO

Science

- Mie scattering
- Thermodynamics
- Nucleation dynamics

Analytical

- Raman spectroscopy



WHERE WE ARE TODAY

Science

- A system for the study of thermodynamics and kinetics in particles as small as 4nm has been constructed and demonstrated.

Analytical

- The BNL Single Particle Laser Ablation Time of Flight Mass Spectrometer (SPLAT-MS) can size and obtain chemical composition of individual particles down to 50nm.

ROAD MAP

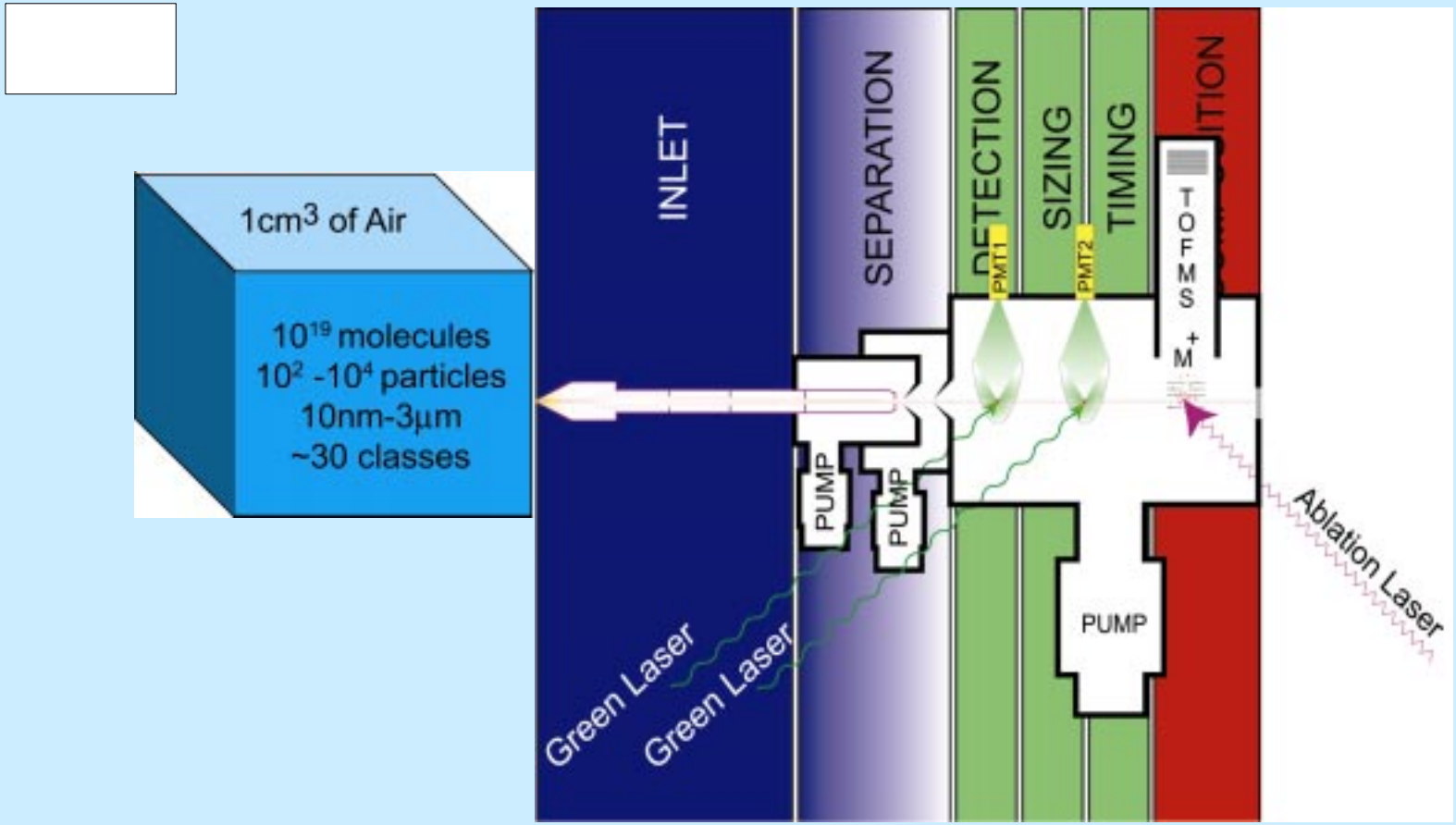
- SPLAT-MS
  - Basics
  - Where it has been: Preliminary results from Houston
  - Where we are going with it

- Thermodynamics and kinetics on the nanoscale
  - The system
  - Very recent results
  - Where we are going with it

SPLAT-MS APPLICATIONS

- Atmospheric aerosols (OBER/ACP/TAP)
- Aerosol production by combustion processes (BES/CHEM)
- Aerosols and diesel engines (Fossil Energy)
- Biochemical agent detection (DOE, DOD, …)
- Monitoring semiconductor manufacture (Bell Labs)
- NOAA/NSF funded program
- EPA funded program

SPLAT-MS the BASICS



AERODYNAMIC SIZING