

PROJECT facts

Advanced Research

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U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY



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DEVELOPMENT OF ON-LINE INSTRUMENTATION AND TECHNIQUES TO DETECT AND MEASURE PARTICULATES

The goal of this project is to develop an on-line instrument using multi-wavelength lasers that is capable of characterizing particulate matter (PM) generated in fossil energy combustion systems. The feasibility of the technique to characterize PM size, distribution, and density will be demonstrated in the laboratory. The instrument design will incorporate multiple color lasers in a miniaturized enclosure (approximate size of 6"x12"x4") to collect PM data in an *in situ* real time mode. Following laboratory evaluation, the instrument will be tested on an engine intake and exhaust.

Compared with traditional particulate measurement instruments, which put many limits on particulate sample handling, this instrument will be able to conduct open-air measurement. This is particularly useful for online measurement of particulates (in liquid and easy to evaporate forms) emitted from combustion engines and boilers.

Progress so far has shown that in the laboratory, this instrument can measure the differences of standard particles with sizes under 2.5 μ m (PM2.5). The results are consistent with theoretical simulations.

We have also discovered that we can measure the scattering from single particles with sizes well under microscopic resolution, ~ 400nm. This new discovery could help get detailed particulate information from combustion emissions and also could help biological and chemical research.



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PROJECT COST

\$798,288

PROJECT DURATION

10/01/2002 -09/30/2005

WEBSITES

www.netl.doe.gov/coal

