Technology Summary

Sensors for measuring size distribution of airborne particulate matter (PM), especially in the size range less than 1 µm, are required for various applications related to fine and ultrafine particles. With the increasing health concern of fine PM in air, air quality monitoring has a growing demand for a cost-effective, miniature and lightweight PM sensors.

Researchers at VCU have developed a miniature electrical particle sizer (mini-eUPS) with an extended sizing-range via a curved design to greatly reduce the size of the design. This design allows for extended particle sizing range, with maximized space utilization, when compared to counterparts with the classical configurations. The mini-eUPS extends the length of classification channel by at least a factor of 3 or more when compared to mobility classifiers in the classical configurations of the same physical size.

Based on its design, the mini-eUPS can be operated in two modes- precipitation and size-classification. Both modes have been tested and proven to extend particle range with sufficient sizing resolution. The figure to the left demonstrates the performance of mini-eUPS in the size-classification mode where total flow rate of 1.8 lpm and aerosol to sheath flow rate of 1:5 for particles from 30 nm to 200 nm.

Technology Status

Prototypes have been developed and tested.
Patent Pending: U.S. and foreign rights available

This technology is available for licensing to industry for further development and commercialization.