The single-particle extinction and scattering method for online characterization of submicron particles: Principles and applications to aerosol research

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We will introduce the single-particle extinction and scattering (SPES) method as a new fundamental tool for online measurements of submicron particles and its applications to aerosol research. The SPES method accurately determines the amplitude and phase of the forward-scattered wave from a single particle on the basis of the interference patterns between the scattered and the incident fields when the particle traverses a tightly-focused laser beam. The complex refractive index and volume of the detected particle can be estimated from the SPES data using our original data-processing algorithm. In the presentation, we will talk about the measurement principle, the theoretical framework of data analysis including the potential effects of particle shape, the performance tests, and some applications to black carbon and mineral particles.

Keywords: aerosol, dust, black carbon, biological particles, marine suspended particles, measurement technique

