

Interactive comment on “A Wavelength Dispersive Instrument for Characterizing Fluorescence and Scattering Spectra of Individual Aerosol Particles on a Substrate” by Donald R. Huffman et al.

Anonymous Referee #1

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General Comments This manuscript is interesting, important and well written. I like it. It appears to be a major step forward in developing low cost instrumentation for aerosols, especially biological aerosols. Because of the low cost I suspect that, as the authors suggest, versions of this instrument will be used to study aerosols over a much larger spatial range than possible with presently available instruments. Present instruments are too expensive. The potential for making apps for cellphones to record the spectra and send these to one location for assembling the data from all the sensors is appealing. This is first I remember seeing the suggestion to spectrally disperse the emission from aerosol particles spread randomly in 2D. I recommend publication and do not suggest any mandatory changes.

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Specific Comments The authors may want to think about, and possibly comment on, the following. Possibly more could be said about the smaller end of the size range of biological particles that could be detected. What is the large dimension of the smallest particles measured? Could a 1 micron bit of a fungal spore be detected? As compared to illuminating with a line source that must be stepped in one direction over the image, this approach needs no moving parts. What is given up for this advantage? Is the maximum number of particles per area that could be analyzed lower? I think yes. Is the spectral range less? Again, I think yes. That probably isn't so important for fluorescence because the bands are not sharp so 20 wavelength bands may be adequate. Raman was mentioned. In Raman spectroscopy the light from 0 to 4000 cm^{-1} might be spread over 1000 pixels or so when illuminating with a line source. That requires significant distance on the camera. I wonder if the problem of overlapping spectra would make this multi-particle spectrometer approach unworkable for Raman in cases where a large wavenumber range is desired.

Technical Corrections 586, 592, 602 “fluorescent spectra”, should be changed to “fluorescence spectra” as in every other time it occurs in the paper. 425 “grass-type pollens (i.e. Ambrosia or ragweed)”? Ambrosia is not a grass. It is in Compositae (Aster family). If ragweed is in a grass-type pollen group, I suggest a citation for “grass-type pollen.”

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