

## Measuring Monosize Particles with the Saturn DigiSizer

Micromeritics Saturn DigiSizer<sup>®</sup> 5200 measures particle diameters from information derived from Mie scattering patterns of monochromatic light passing through the particles. The technique requires first acquiring the scattering pattern and then determining the size of the particles that would produce such a pattern. Obviously, the more detailed the pattern and the wider the angles covered, the better can be the analysis.

The patterns given below are representative of analyses made on very nearly monosize polystyrene spheres. They are significant in themselves because they permit the great sensitivity of the Saturn DigiSizer to be demonstrated. Instrument sensitivity does not depend on the size of the particles or their distribution of sizes, but clearly to demonstrate sensitivity does require an uncomplicated particle system, i.e., a monosize one.

The plot in Figure 1 is a scattering pattern of 11- $\mu\text{m}$  diameter spheres measured by the Saturn DigiSizer. The circles represent the data points and the solid line is the spline interpolation constrained to pass through the points. It is the points on this curve that are then fitted to yield particle size.

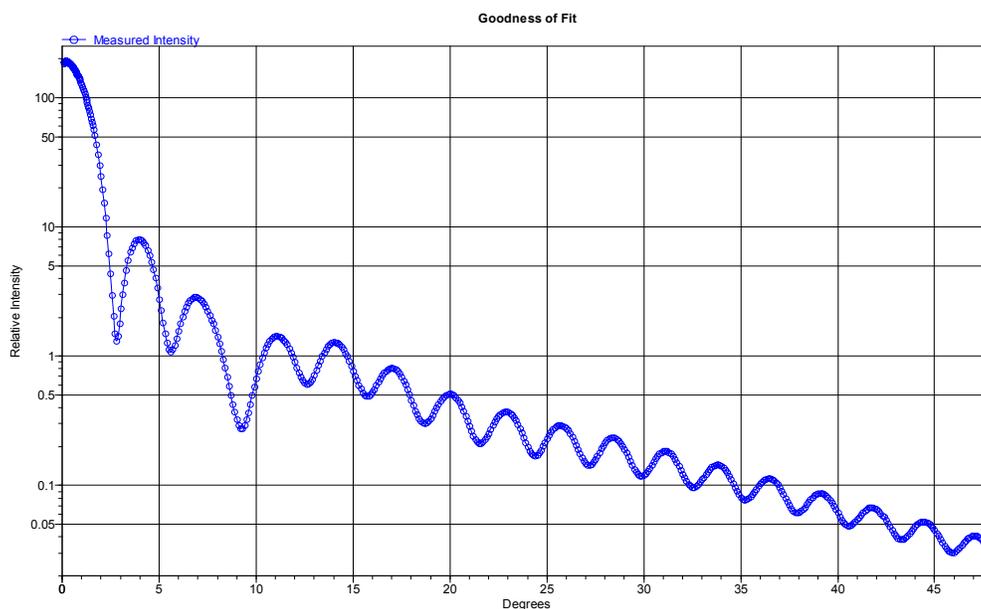


Figure 1. Scattering pattern of 11- $\mu\text{m}$  diameter spheres.

Figure 2 shows the pattern for 77- $\mu\text{m}$  diameter spheres and, as before, with data points and fitted curve. This curve is repeated in segments (Figures 3, 4, and 5) without the points so that the full extent of the detail is evident. It is possible to identify 96 lobes on the scattering pattern for this second material.

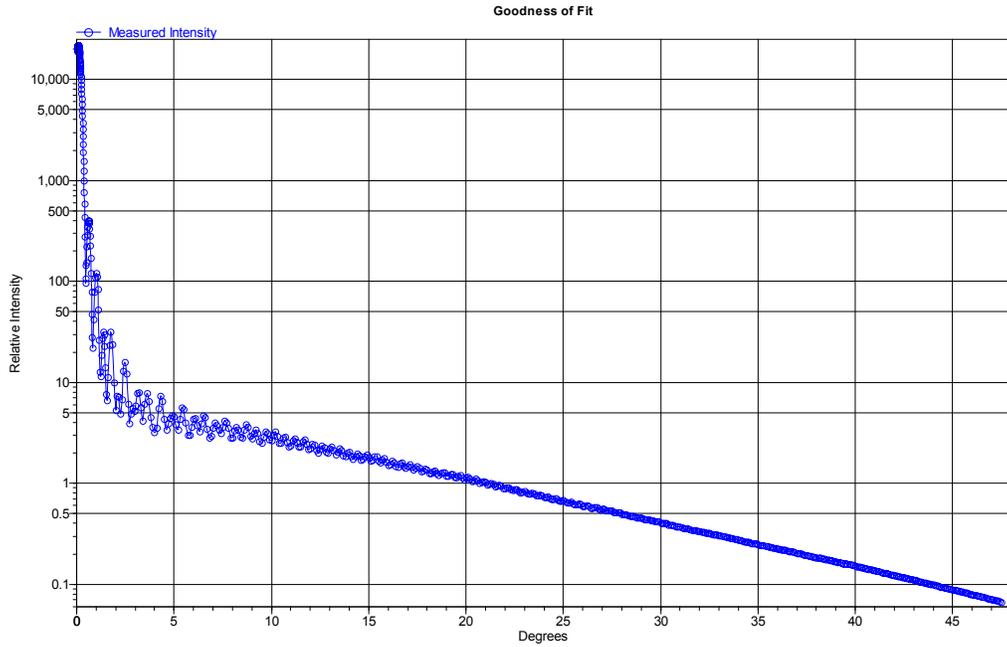


Figure 2. Scattering pattern of 77- $\mu\text{m}$  diameter spheres.

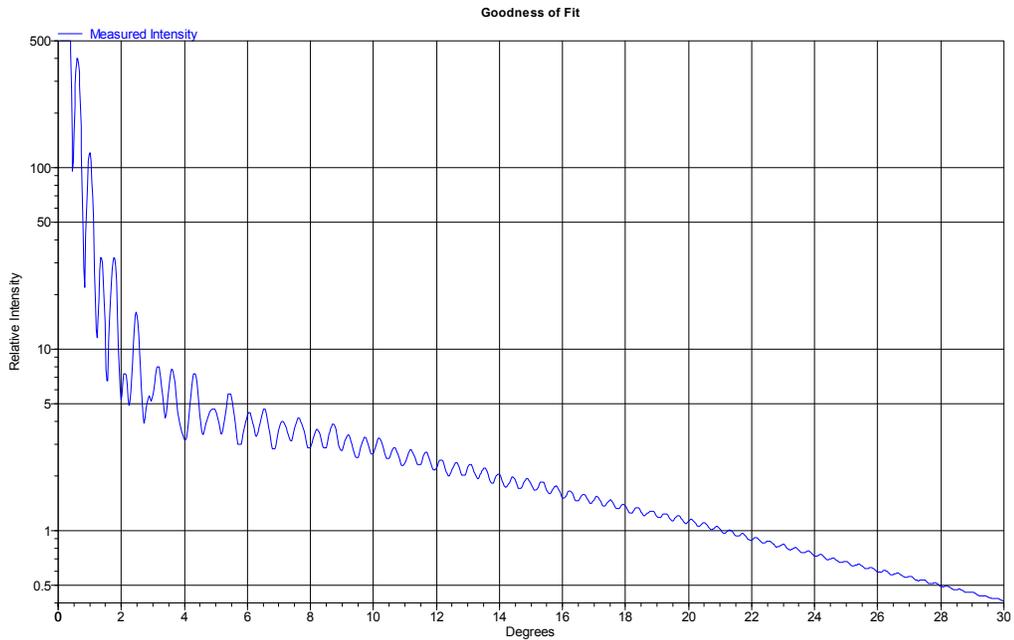


Figure 3. Scattering pattern of 7- $\mu\text{m}$  spheres at angles from 0 to 30.0 degrees.

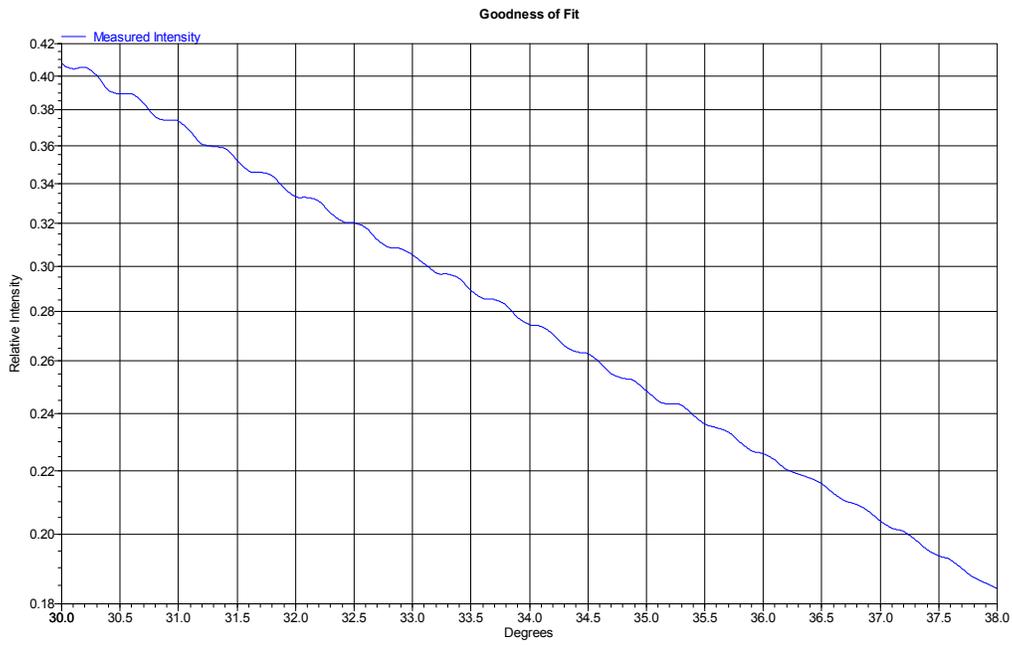


Figure 4. Scattering pattern of 77-μm spheres at angles from 30.0 to 38.0 degrees.

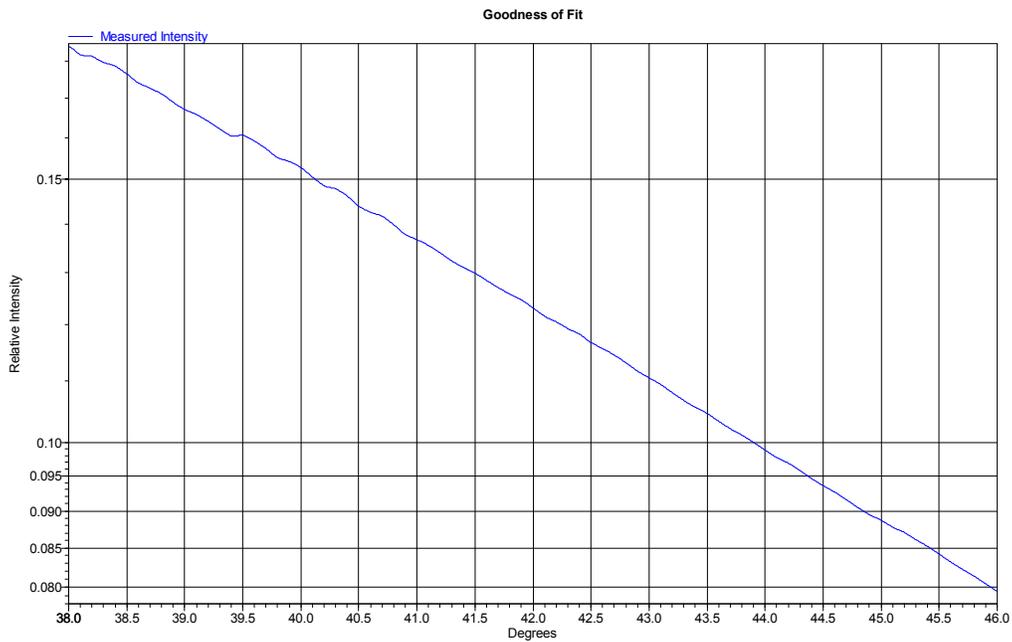


Figure 5. Scattering pattern of 77-μm spheres at angles from 38.0 to 46.0 degrees.