

**W0373**

**Small-Angle Scattering Size Distributions.** Pete R. Jemian, UNICAT Advanced Photon Source, Univ. of Illinois at Urbana-Champaign, Argonne, IL.

Explanation of small-angle scattering data by the presence of size distribution of density inhomogeneities (scatterers) is an example of an overdetermined problem in mathematics. Various methods to constrain the solution have been developed. Most simply, by assuming a functional form for the size distribution, such as Gaussian or log-normal, solution by least squares minimization of residuals is direct (see Vonk).

In order to drop this assumption of a functional form, more powerful numerical methods need to be employed. By describing the size distribution as a population histogram against some characteristic dimension, one can employ a regularization method such as maximum entropy to provide additional constraint.

Regularization methods alternative to entropy maximization have been developed to minimize the possible production of noise in the histogram size distribution. This poster (<http://www.uni.aps.anl.gov/~jemian/docs/aca-2005>) describes the method by which the additional constraint of non-negative histogram bins may be added to a regularization method which minimizes the curvature deviations of the histogram. Comparisons are made with the other methods discussed.