**Theoretical Treatment and Practical Aspects of Systems with Preferred Orientation**

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While scattering data generated from solution is usually isotropic, an anisotropic shape of the structural unit in a sufficiently dense system can lead to preferred orientation which poses interesting problems both theoretically and practically.

Straightforward treatments of preferred orientation based on truncated expansions into spherical harmonics are known to converge poorly unless both the orientation distribution and the intensity distribution of the structural unit are sufficiently broad.

Therefore, we consider the problem of preferred orientation on the level of the integral transformation relating the intensity distribution of the structural unit to that of the preferentially oriented ensemble. Under the assumptions of cylindrical symmetry of both the structural unit and the ensemble and of statistical independence of orientation and position of the structural units, the treatment can be kept exact without approximation.

The state of the literature on this topic will be briefly reviewed. We will focus on orientation distribution functions for which all or most of the involved integrations can be solved analytically. Practical applications of these techniques to both small-angle and wide-angle scattering from various systems of interest will be discussed, many of which leading to rather compact fully analytic closed-form expressions for the resulting intensity distributions that previously were only treated numerically.

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