Nano Structures Can Pose Big Measurement Problems

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Materials scientists will tell you that to best understand, characterize and eventually utilize the properties of a specific material, you have to be able to define how the atoms within it are arranged. In the case of common crystals, there are numerous methods, such as X-ray diffraction, by which this can be done.

Not so for nanostructured materials (structures with atomic arrangements at a scale of 1-100 nanometers, or between 5 to 1,000 atoms in size) where the inability to determine atomic order with high precision has been dubbed the “nanostructure problem.”

In a paper published in the April 27 *Science*, researchers Igor Levin at the National Institute of Standards and Technology and Simon J.L. Billinge at Michigan State University reviewed various classes of nanostructured materials, listed the array of methods currently used to study their atomic makeup and defined the problems inherent with each one.

Overall, the authors state that while many methods exist for probing the atomic structure on the nanoscale, no single technique can provide a unique structural solution.

The authors conclude their paper by calling for a coordinated effort by researchers to develop a coherent strategy for a comprehensive solution of the “nanostructure problem” using inputs from multiple experimental methods and theory.

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