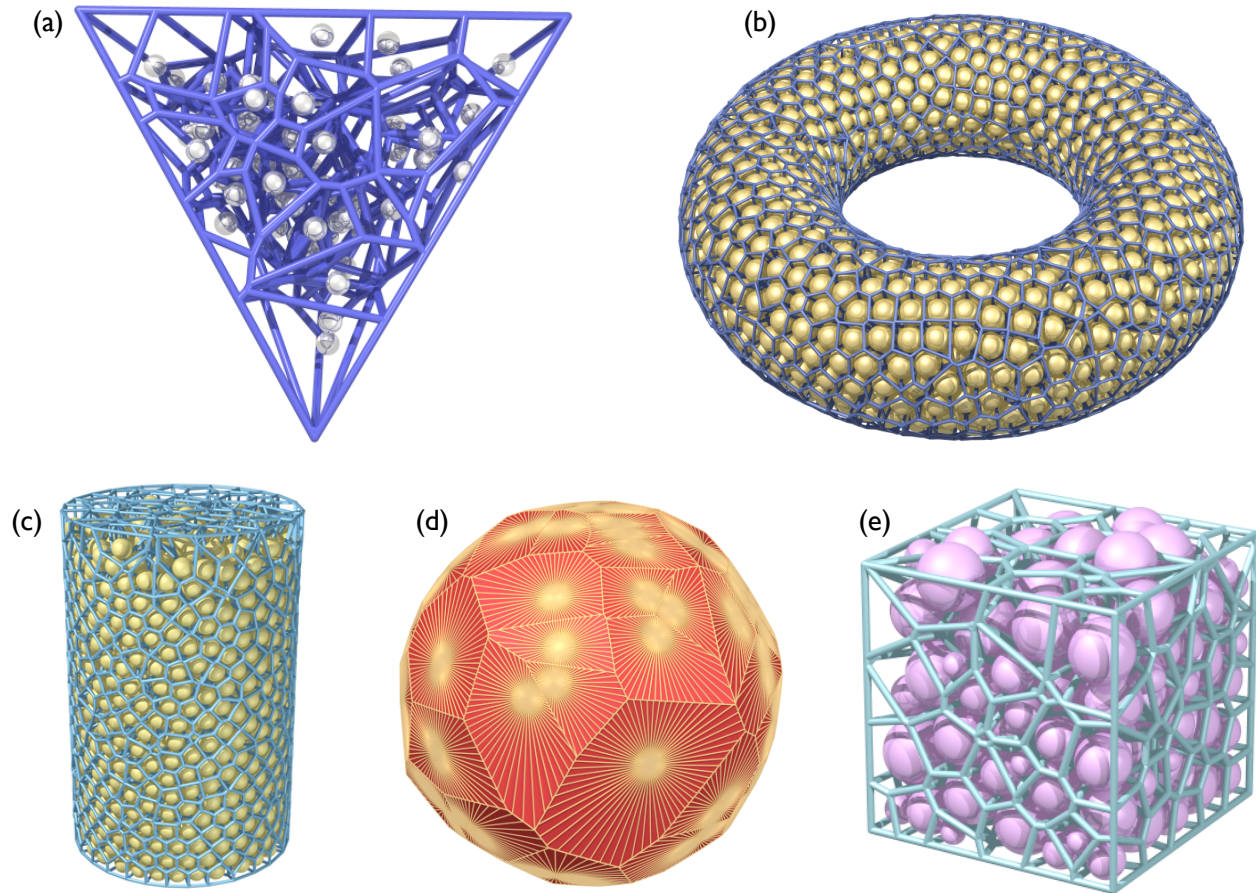


Voro++: A three-dimensional Voronoi cell library in C++

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Voro++ is an open source software library for the computation of the Voronoi tessellation, originally proposed by Georgy Voronoi in 1907. For a set of points in a domain, the tessellation is defined by associating a cell of space to each point that is closer to that point than any other. It has applications in many fields, and in physics and materials science it has been used extensively in the analysis of particle systems, for tracking changes in density, or for examining local neighbor relationships. While other mature software libraries exist (particularly *Qhull*, used by *MATLAB*), Voro++ has been designed specifically for handling large-scale 3D research problems where flexibility is required. It is structured around several C++

classes and is designed to be easily modified and incorporated into other programs. A particular strength of the code is the ability to tailor the computation of individual cells to easily handle walls and other complex boundary conditions. Plane wall surfaces can be computed exactly (a), while curved surfaces (b,c) can be well-approximated. The code deals with truncation errors in floating point arithmetic, and can natively handle degenerate cases where Voronoi cells with high-order vertices may form (d). Neighbor calculations and tessellations for polydisperse particle packings (e) are also supported. The code exhibits high-performance and can be adapted to multicore architectures. For more information, see <http://math.lbl.gov/voro++/>.