Scilight

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A rough wall is like no wall at all for colloidal glass

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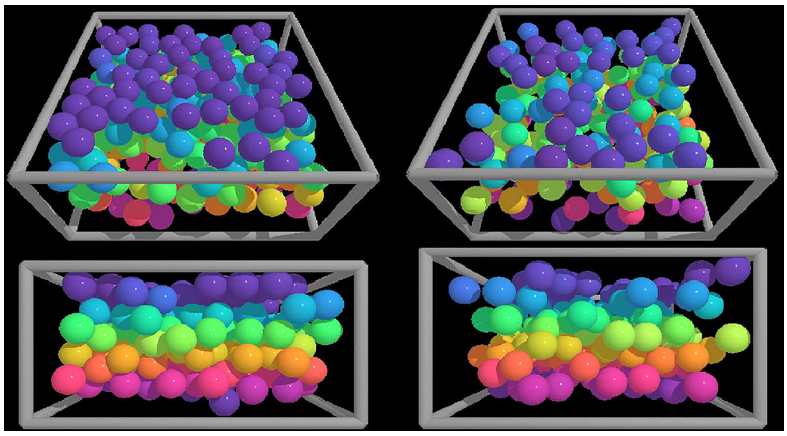
Rough walls erase the effect of a container in the behavior of colloidal glasses.



Colloidal particles are a useful model system to study glasses, the noncrystalline solids pervasive in industrial materials yet still not well understood at the molecular level. The spherical particles of colloidal glass behave the same way as molecules in glasses, but are large enough to see with microscopy.

In *The Journal of Chemical Physics*, researchers report that the walls of a container holding a colloidal glass sample can affect how particles near the walls behave. But using a container with rough walls can actually remove the wall's influence.

Two types of chambers housed colloidal samples for this study: one with smooth walls and one with walls roughened by attached particles. The samples are aging, meaning they were out of equilibrium and their constituent particles were rearranging to find a better structure. The researchers followed particle motion for two hours using the 3-D confocal microscopy imaging technique.

Particles next to smooth walls formed layers and aged slower, while particles farther away from the wall were less ordered. Next to rough walls, particles didn't form layers, and acted the same as those farther away from the walls.

Co-author Eric Weeks said that this is the first quantitative demonstration that rough surfaces can erase walls' effects. The results are important not only to researchers using colloidal glass experimentally, but also for simulating these systems computationally and even possibly using them in nanotechnological applications.

The authors plan to continue investigating colloidal behavior and examine what happens with more variations of the boundary structure beyond simply rough and smooth walls.

Source: "Aging near rough and smooth boundaries in colloidal glasses," by Cong Cao, Xinru Huang, Connie B. Roth, and Eric R. Weeks, *The Journal of Chemical Physics* (2017). The article can be accessed at https://doi.org/10.1063/1.5000445.