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Interplay of gravity and diffusion in crystallization of on hard-sphere colloids.[1] BORIS KHUSID, LOU KONDIC, MICHAEL LAM, New Jersey Institute of Technology, WILLIAM V. MEYER , Universities Space Research Association — Vital for a variety of industries, from 3D printing to photonics, electronics, chemicals, and pharmaceuticals, colloids also serve as an excellent model system to reveal crystallization mechanisms in condensed matter at a particle level. Despite extensive studies, the nature of the glass transition in hard-sphere suspensions unexpectedly discovered in terrestrial experiments about 30 years ago still remains elusive and hotly debated. The presented theory and comparison of data on crystallization in microgravity and on Earth show that the observed glass transition is caused by the swirling of settling particles. Presented findings bring a novel insight into the interplay between gravity and diffusion in colloidal crystallization and open the door to development of novel materials of tailored structures.

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