

## In situ characterization of colloidal crystallization

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### Abstract

Selfassembly has long been used as a successful way to prepare 3d photonic crystals. The formation of silica colloidal crystals by self-assembly, by any of the different ways tested to date [1], is still far from understood. Vertical deposition is the most widely used method and has been studied in more detail in the last few years [2,3]. Hitherto, the understanding of colloidal crystallization early stages is still poor mainly due to the difficulty of direct observations. Recent experiments show small clusters nucleation can direct colloidal crystallization afterwards [4]. However, new experiments on direct visualization of colloidal nucleation with single particle resolution suggest that crystallization may occur from amorphous aggregates rather than from small ordered clusters [5]. We have performed *in situ, real-time* optical characterization of silica colloidal suspensions during crystallization (sedimentation) that might shine new light on this specific topic supporting the latter mechanism. The understanding of self-assembly at these scales is of paramount importance in modern materials science and we believe our results will help to unveil some of its secrets.

### References

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