Directed Material Assembly by Optical and Acoustic Forces

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We present a novel concept based on the idea that mechanical forces arising from optical traps and standing acoustic waves can be used to influence ongoing chemical reactions. These forces dictate the spatial distribution of the materials, their mesoscopic structure, the kinetics of the reaction, and influence the formation of new hybrid materials. This is a paradigm shift compared to other "bottom-up" methods for material assembly that conventionally rely on accumulation of preformed materials.

A key feature of this approach is its modularity, as it could be implemented on various material systems. Due to the flexibility in material choice, this innovative approach will open the door to new ways to act upon materials, with envisioned applications for electronics, photonics and drug delivery systems.