

Abstract Submitted
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A novel generic method for size-selective purification of nanoparticles based on the critical Casimir effect¹ HONGYU GUO, GHEORGHE STAN, YUN LIU, NIST - Natl Inst of Stds Tech — The properties and applications of nanoparticles (NPs) strongly depend on their size and size distribution. However, NPs, unlike atoms, are never monodisperse, making it is highly desirable to reduce the polydispersity for well-defined properties and functions. Notwithstanding the continual improvement of synthesis methods, purification and size-selective separation of NPs remain significant challenges. Here we conclusively demonstrate the effectiveness of a novel size-selective particle purification method based on the physical phenomenon of critical Casimir forces induced selectively reversible aggregations of colloidal particles immersed in a binary solvent through temperature and composition control. Moreover, due to the universality of the involved critical phenomena, our method is generic for many colloidal particles and can be instrumental in tailoring their nanoscale properties and applications.

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Hongyu Guo
NIST - Natl Inst of Stds
Tech

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