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Photonic Droplets Containing Transparent Aqueous Colloidal Suspensions with Optimal Scattering Properties JIN-GYU PARK, SOFIA MAGKIRIADOU, Department of Physics, Harvard University, YOUNG-SEOK KIM, Korea Electronics Technology Institute, VINOTHAN MANOHARAN, Department of Physics, Harvard University, HARVARD UNIVERSITY TEAM, KOREA ELECTRONICS TECHNOLOGY INSTITUTE COLLABORATION — In recent years, there has been a growing interest in quasi-ordered structures that generate non-iridescent colors. Such structures have only short-range order and are isotropic, making colors invariant with viewing angle under natural lighting conditions. Our recent simulation suggests that colloidal particles with independently controlled diameter and scattering cross section can realize the structural colors with angular independence. In this presentation, we are exploiting depletion-induced assembly of colloidal particles to create isotropic structures in a milimeter-scale droplet. As a model colloidal particle, we have designed and synthesized core-shell particles with a large, low refractive index shell and a small, high refractive index core. The remarkable feature of these particles is that the total cross section for the entire core-shell particle is nearly the same as that of the core particle alone. By varying the characteristic length scales of the sub-units of such 'photonic' droplet we aim to tune wavelength selectivity and enhance color contrast and viewing angle.

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