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Abstract for an Invited Paper
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Effects of confinement on nanoparticle flows¹

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The transport properties of nanoparticles that are dispersed in complex fluids and flowed through narrow confining geometries affect a wide range of materials shaping and forming processes, including three-dimensional printing and nanocomposite processing. Here, I will describe two sets of experiments in which we use optical microscopy to probe the structure and transport properties of suspensions of particles that are confined geometrically. First, we investigate the structure and flow properties of dense suspensions of submicron particles, in which the particles interact via an entropic depletion attraction, that are confined in thin films and microchannels. Second, we characterize the transport properties of nanoparticles, dispersed at low concentration in water or in aqueous solutions of high-molecular weight polymers, that are confined in regular arrays of nanoposts or in disordered porous media. I will discuss our results and their practical implications for materials processing as well as for other applications that require confined transport of nanomaterials through complex media.

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