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Abstract for an Invited Paper
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Soft particles with anisotropic interactions¹

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Responsive colloids such as thermo- or pH-sensitive microgels are ideal model systems to investigate the relationship between the nature of interparticle interactions and the plethora of self-assembled structures that can form in colloidal suspensions. They allow for a variation of the form, strength and range of the interaction potential almost at will. While microgels have extensively been used as model systems to investigate various condensed matter problems such as glass formation, jamming or crystallization, they can also be used to study systems with anisotropic interactions. Here we show results from a systematic investigation of the influence of softness and anisotropy on the structural and dynamic properties of strongly interacting suspensions. We focus first on ionic microgels.^{2 3} Due to their large number of internal counterions they possess very large polarisabilities, and we can thus use external electrical ac fields to generate large dipolar contributions to the interparticle interaction potential. This leads to a number of new crystal phases, and we can trigger crystal-crystal phase transitions through the appropriate choice of the field strength.^{4 5} We then show that this approach can be extended to more complex particle shapes^{6 7} in an attempt to copy nature's well documented success in fabricating complex nanostructures such as virus shells via self assembly.⁸

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