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Two-dimensional soft solids: a rheological study[1] GABRIEL ESPINOSA, Department of Physics, Simon Fraser University, Burnaby, BC, DUYANG ZANG, Laboratory of Materials Science in Space, Northwestern Polytechnical University, Xi-an, China, DOMINIQUE LANGEVIN, Laboratoire de Physique des Solides, Université Paris Sud, Orsay, France, BERNARD BINKS, Department of Chemistry, University of Hull, Hull, UK — Many soft solids, such as concentrated suspensions, emulsions, foams, behave in a similar way under an applied shear: they exhibit a Maxwell-type relaxation with a characteristic relaxation time that varies inversely with the applied shear rate. When the storage and loss moduli are measured at different frequencies and constant shear rate, the curves obtained can be rescaled [1]. We will show here that the behavior in two dimensions can be strikingly similar. We will present data on monolayers of nanoparticles and on mixed layers made with DNA and surfactant. The physical origin of the relaxation time will be discussed. The nonlinear behavior will be also discussed. Depending on the compaction degree, the layers can behave as brittle or plastic solids. This has been confirmed by images of the layers after a shear deformation made using Brewster angle microscopy.

[1] H. M. Wyss, K. Miyazaki, J. Mattsson, Z. Hu, D. R. Reichman, and D. A. Weitz, Phys. Rev. Lett. **98**, 238303 (2007).

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