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Assembly of particles at fluid-fluid interfaces using electric fields NADINE AUBRY, PUSHPENDRA SINGH, MUHAMMAD JANJUA, SAI NUDURUPATI, Department of Mechanical Engineering — In this talk, we present a new technique to assemble micro- and nano-sized particles into monolayers (two-dimensional arrays). For this, we sprinkle particles at a fluid-fluid interface (or at the free surface of a liquid) and apply a uniform electric field normal to the interface. The electric field generates horizontal electrostatic forces on the particles due to dipole-dipole forces which, together with the capillary forces, put the particles into motion until their reach an equilibrium position where the two forces balance each other. In the final arrangement, particles are placed at a certain distance of one another, a distance which can be controlled by varying the electric field strength. The technique, which works on a variety of particles, including micro/nano-sized and neutral particles, is investigated both experimentally and theoretically. A good quantitative agreement between the two approaches is found.

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