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Electric-field-induced motion of colloid particles in smectic liquid crystals ANTAL JAKLI, GUANGXUN LIAO, IVAN SMALYUKH, JACK KELLY, OLEG LAVRENTOVICH, Kent State University — We present the first observations of DC electric-field-induced rotational and translational motion of finite particles in liquid crystals. The electro-rotation is basically identical to the well known Quincke rotation, which triggers the translational motion at higher fields. From the electric field dependence of the angular velocity of the rotation we obtain the viscosity of the liquid crystals. The analysis of the translational motion in smectic liquid crystals indicates elastic responses near the threshold for translation. At increasing fields the speed of the particles is increasing and at sufficiently high speeds the flow of the smectic A and smectic C liquid crystal around the beads become purely viscous. Colloid particles in smectic materials maybe considered as model systems for understanding motion of proteins in cell membranes.

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