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Precise measurements of droplet-droplet contact forces in quasi-2D emulsions JANNA LOWENSOHN, CARLOS ORELLANA, ERIC WEEKS, Emory University — We use microscopy to visualize a quasi-2D oil-in-water emulsion confined between two parallel slides. We then use the droplet shapes to infer the forces they exert on each other. To calibrate our force law, we set up an emulsion in a tilted sample chamber so that the droplets feel a known buoyant force. By correlating radius of the droplet and length of contacts with the buoyant forces, we validate our empirical force law. We improve upon prior work in our lab by using a high-resolution camera to image each droplet multiple times, thus providing sub-pixel resolution and reducing the noise. Our new technique identifies contact forces with only a 1% uncertainty, five times better than prior work. We demonstrate the utility of our technique by examining the normal modes of the droplet contact network in our samples.

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