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Measuring every particle's size in a confocal microscopy experiment ERIC WEEKS, Physics Dept., Emory University, REI KURITA, Institute of Industrial Science, University of Tokyo — We have developed a technique to estimate the radius of every particle observed in a confocal microscopy experiment. From simulations, we verify that the particle radii are estimated to high accuracy in a variety of samples: dense colloidal suspensions, colloidal gels, and binary samples. This method allows us to determine *in situ* the particle size distribution. Furthermore, this method lets us find relationships between individual particle size and dynamical behaviors. First, crystal nucleation occurs in regions that are locally more monodisperse. Second, in dense samples, particle mobility is well correlated with the local volume fraction, defined as the true particle volume divided by the particle's Voronoi volume.

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