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Liquid to solid nucleation through onion-structure droplets[1] KIPTON BARROS, WILLIAM KLEIN, Boston University — We start from a Landau-Ginzburg free energy and develop a theory of crystal nucleation for metastable liquids. Saddle points of the free energy represent nucleating droplets and are obtained analytically and numerically. We find nucleating droplets with hexagonal symmetry in two dimensions and bcc and icosahedral symmetries in three dimensions. Surprisingly, we also find nucleating droplets in three dimensions with a spherically symmetric structure resembling the layers of an onion. These onion-structure objects are the preferred nucleating droplets near the spinodal. We discuss recent experiments and simulations which are consistent with our predictions.

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