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2D Colloidal Wigner crystals in confined geometries RUBEN HIGLER, JORIS SPRAKEL, Wageningen University — Crystallization of bulk systems has been widely studied using colloids as a model system. However, study into colloidal crystallization in confined geometries has been sparse and little is known about the effects of strong confinement on the dynamics of colloidal crystal. In our research we prepare 2D crystals from charged colloids in an apolar solvent to study crystal dynamics, formation, and structure in circular confinements. These confining geometries are made using softlithography techniques from SU-8. In order to broaden the parameter space we can reach in experiments we employ brownian dynamics simulations to supplement our experimental results. Using single-particle tracking we have subpixel resolution positional information of every particle in the system. We study the vibrational modes of our confined crystals and find well defined modes unique to confined systems, such as a radially symmetric compression (or breathing) mode, a collective rotation mode, and distinct resonance modes. Furthermore, due to the circular nature of our constrictions, defectless crystals are impossible, we find, for sufficiently high area fractions, that the defects order at well defined points at the edge. The effect of this "defect-localization" has a clear influence on the vibrational modes.

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