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Phase diagram of the composite fermion Wigner crystals ALEX ARCHER, The Pennsylvania State University, KWON PARK, Korea Institute for Advanced Study, JAINENDRA JAIN, The Pennsylvania State University — The energies of the Wigner crystal (WC) phase and the fractional quantum Hall (FQH) liquid have been compared in the past at some special filling factors. We deduce in this work the phase diagram of the WC phase as a function of the general filling factor by considering: (i) the WC of electrons; (ii) WCs of composite fermions (CFs) carrying $2p$ vortices; and (iii) FQH states supporting WC of CF quasiparticles or CF quasiholes. In particular, we find that the re-entrant insulating phase between 1/5 and 2/9 is a WC of composite fermions carrying two vortices. To distinguish the CF Wigner crystal from the electron WC, we compute a number of properties, including shear modulus, magnetophonon and magnetoplasmon dispersions, and melting temperatures. The width dependence of the phase diagram is also studied. A technical innovation that makes these comparisons feasible is to model the WC as the thermodynamic limit of the Thomson crystal on the surface of a sphere, which minimizes the Coulomb energy of classical charged particles.

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