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**Competing liquid and solid orders at $\nu = 1/5$** CHIA-CHEN CHANG, CSABA TOKE, Department of Physics, The Pennsylvania State University, GUN SANG JEON, School of Physics, Seoul National University, Seoul, Korea, JAINENDRA K. JAIN, Department of Physics, The Pennsylvania State University — The lowest Landau level states at very low filling factors are accurately understood as topological quantum crystals of composite fermions. At higher fillings (but still in the lowest Landau level), on the other hand, the system forms an incompressible composite- fermion liquid. However at $\nu = 1/5$, both descriptions fail to give an accurate account to the true ground state. Our numerical calculations show that for small systems the crystal has lower energy than the liquid, and only for $N \geq 10$ does the liquid become the ground state. We find that a linear combination of the CF liquid and the CF crystal wave functions provides an excellent account of the actual state for small systems. These results indicate that the 1/5 fractional Hall state is highly susceptible to the formation of composite fermion crystallites in it. We will discuss the relevance of these results to experiment, and also the possibility of inducing a liquid-solid transition at 1/5 by tuning the interaction.

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