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Interacting composite fermions: Nature of the 4/5, 5/7, 6/7, and 6/17 fractional quantum Hall states[1] AJIT COIMBATORE BALRAM, Niels Bohr Institute — Numerical studies by Wójs, Yi and Quinn have suggested that an unconventional fractional quantum Hall effect is plausible at filling factors $\nu = 1/3$ and $1/5$, provided the interparticle interaction has an unusual form for which the energy of two fermions in the relative angular momentum three channel dominates. The interaction between composite fermions in the second Λ level (composite fermion Landau level) satisfies this property, and recent studies have supported unconventional fractional quantum Hall effect of composite fermions at $\nu^* = 4/3$ and $5/3$, which manifests as fractional quantum Hall effect of electrons at $\nu = 4/11$, $4/13$, $5/13$, and $5/17$. I investigate the nature of the fractional quantum Hall states at $\nu = 4/5$, $5/7$, $6/17$, and $6/7$, which correspond to composite fermions at $\nu^* = 4/3$, $5/3$ and $6/5$, and find that all these fractional quantum Hall states are conventional. The underlying reason is that the interaction between composite fermions depends substantially on both the number and the direction of the vortices attached to the electrons. I also study in detail the states with different spin polarizations at $6/17$ and $6/7$ and predict the critical Zeeman energies for the spin phase transitions between them.

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