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**Nonconventional odd denominator fractional quantum Hall states in the second Landau level** GABOR CSATHY, ASHWANI KUMAR, MICHAEL MANFRA, Purdue University, LOREN PFEIFFER, KEN WEST, Princeton University — The odd denominator fractional quantum Hall states in the second Landau level of a two-dimensional electron gas are believed to be different from those of the lowest Landau level. While at first sight these states could be part of the composite fermion hierarchy, several recent theoretical works suggest that some might be supporting generalized Pfaffian-like correlations. Recent progress in cooling electrons allowed us to observe a new fractional quantum Hall state at the filling factor  $2+6/13$ . By assuming that the effective mass of the composite fermions does not explicitly depend on the Landau level index we find that energy gaps of the prominent  $2+1/3$  and  $2+2/3$  states are consistent with the values predicted by the free composite fermion model. However, the weaker  $2+2/5$  and  $2+6/13$  states deviate significantly from the prediction of this model. This deviation constitutes a first demonstration of the nonconventional nature of the latter two odd denominator fractional quantum Hall states.

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