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Observation of new fractional quantum Hall states in the first Landau level in graphene FRANCOIS AMET, ANDREW BESTWICK, JAMES WILLIAMS, Stanford University, KENJI WATANABE, TAKAHASHI TANIGUCHI, Advanced Materials Laboratory, National Institute for Materials Science, DAVID GOLDHABER-GORDON, Stanford University — We report on transport studies of the fractional quantum Hall effect in the n=0 and n=1 Landau level of monolayer graphene. The quality of the devices studied here -with mobilities up to 400 000cm2/Vs, and magnetic fields up to 45T- allows us to observe a variety of fractional quantum hall states following the composite fermion sequence, with denominators up to 9. The presence of odd numerator fractions between nu=1 and nu=2 is attributed to the breaking of the valley symmetry and correlates with a zero field insulating state observed at charge neutrality. We discuss the in-plane field dependence of the gaps, which is not trivial and shows dramatic differences between the n=0 and the n=1 Landau levels.

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