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QCD thermodynamics with $N_f = 3, 2 + 1$ near the continuum limit at realistic quark masses TAKASHI UMEDA, MICHAEL CHENG, NORMAN CHRIST, CHULWOO JUNG, FRITHJOF KARSCH, ROBERT MAWHINNEY, PETER PETRECZKY, KONSTANTIN PETROV, CHRISTIAN SCHMIDT, Brookhaven National Laboratory — We report our study of the thermodynamics with 3 and 2+1 flavors of QCD. In order to investigate the properties near the continuum limit we adopt improved staggered (p4) quark actions coupled with a tree-level Symanzik improved glue on $N_t = 4$ and 6 lattices. The simulations are performed with small light quark masses at which the pion mass is about 200 MeV or larger. In this talk we present several thermodynamical quantities such as critical temperature, phase diagram, and equation of states. To estimate the systematic uncertainties of these results, we also compare the results with several types of improved staggered quark action.

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