The Equation of State for QCD with 2+1 Flavors of Quarks

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Abstract: We report results for the interaction measure, pressure and energy density from dynamical finite temperature calculations with 2+1 flavors of improved staggered fermions. The simulations use a Symanzik improved gauge action and the Asqtad $O(a^2)$ improved staggered fermion action for lattices with temporal extent of $N_t = 6$. The heavy quark mass m_s is fixed at approximately the physical strange quark mass and the two degenerate light quarks have masses $m_{u,d} = 0.1m_s$ and $0.2m_s$. The calculation of the thermodynamic observables employs the integral method where energy density and pressure are obtained by integration over the interaction measure.