- **The QGP equation of state at $T \geq T_c$; quasiparticle model vs. lattice QCD**

massive quasiparticles

$$m_g^2 = \frac{1}{6}\left[\left(N_c + \frac{1}{2}N_f\right)T^2 + \frac{3}{2\pi^2}\sum_q \mu_q^2\right] g^2$$

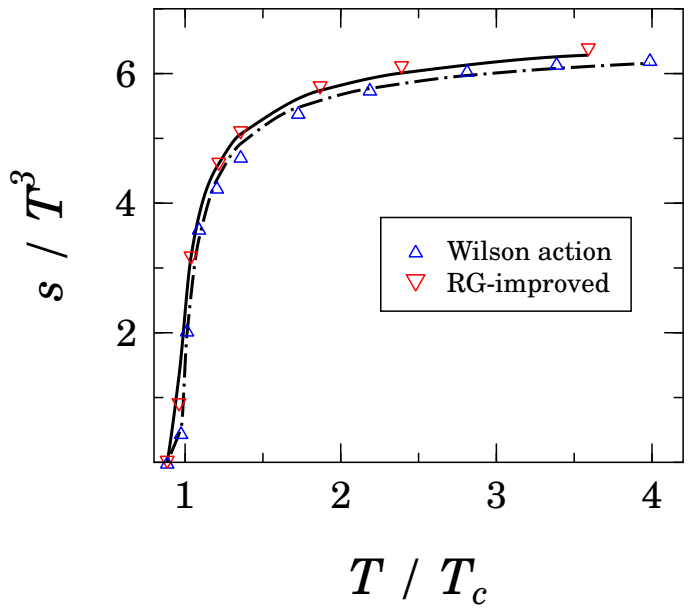
$$m_q^2 = \frac{N_c^2 - 1}{8N_c}\left[T^2 + \frac{\mu_q^2}{\pi^2}\right] g^2$$

self-consistent thermodynamics

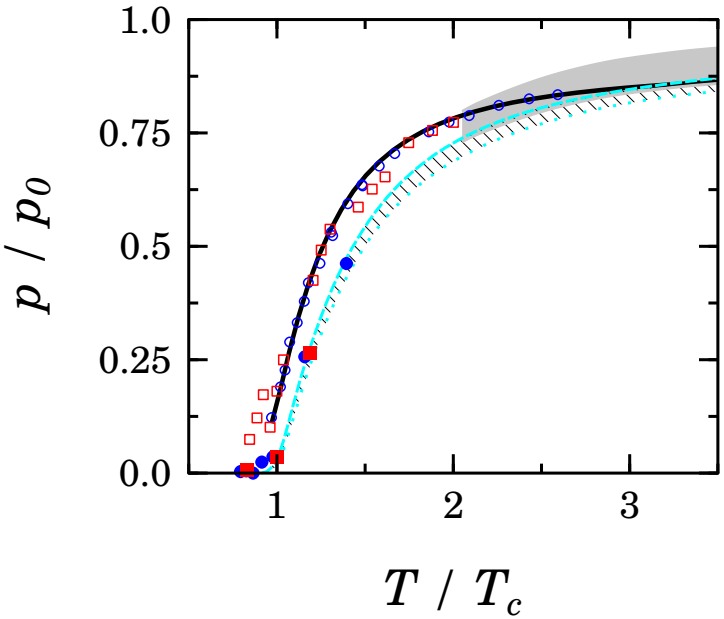
$$p(\mu, T) = \sum_j p_{\rm id}(\mu, T; m_j^2) - B(m_i^2)$$

'bag' function B from $\dfrac{\partial p}{\partial m_i^2} = 0$

⋆ quenched QCD (lattice data: Boyd et al., Okamoto et al.)



⋆ $N_f = 2$ (lattice data: Karsch et al., Ali Khan et al.)

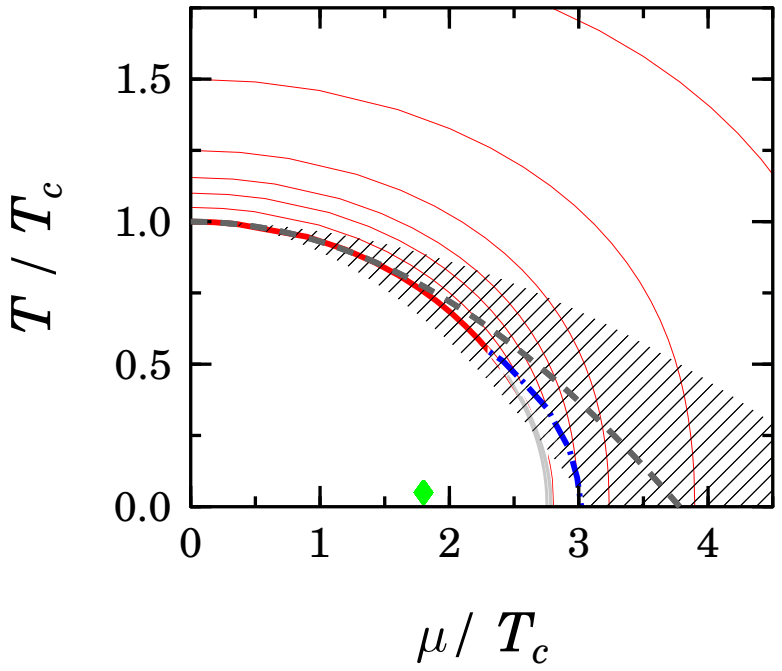


- **Quasiparticle model: extension to finite baryon density**

Maxwell relation $\partial s(T,\mu,g^2)/\partial\mu = \partial n(T,\mu,g^2)/\partial T$

$$\Rightarrow\ a_T\Big(T,\mu,g^2\Big)\,\frac{\partial g^2(T,\mu)}{\partial T} + a_\mu\Big(T,\mu,g^2\Big)\,\frac{\partial g^2(T,\mu)}{\partial \mu} \;=\; b\Big(T,\mu,g^2\Big)$$ flow equation

⋆ critical line (lattice data: Allton et al.)



⋆ full equation of state