Bari Xmas Workshop 2012

Myself and my research

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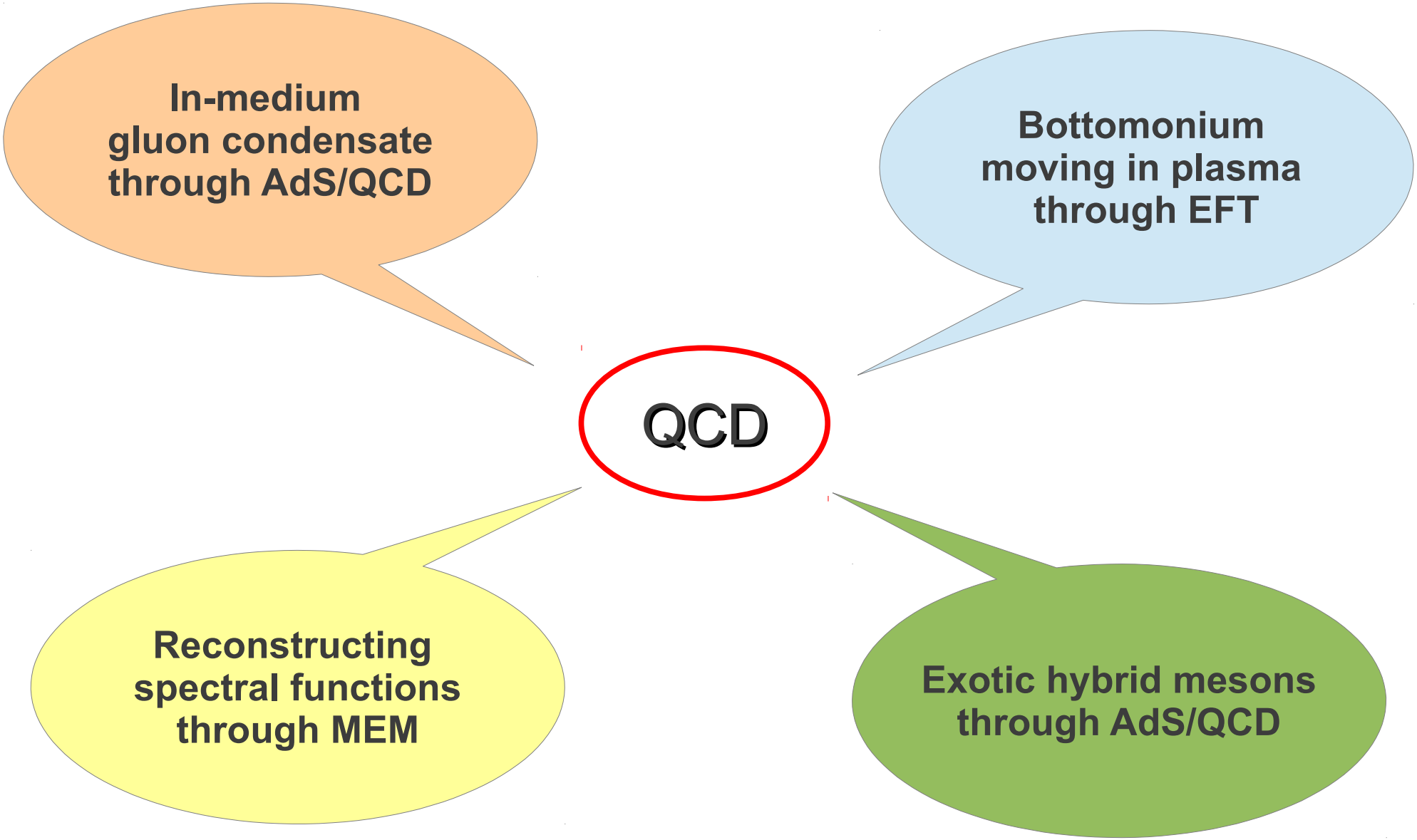

In-medium
gluon condensate
through AdS/QCD
Bottomonium
moving in plasma
through EFT
QCD
Reconstructing
spectral functions
through MEM
Exotic hybrid mesons
through AdS/QCD

Bottomonium moving in plasma through EFT

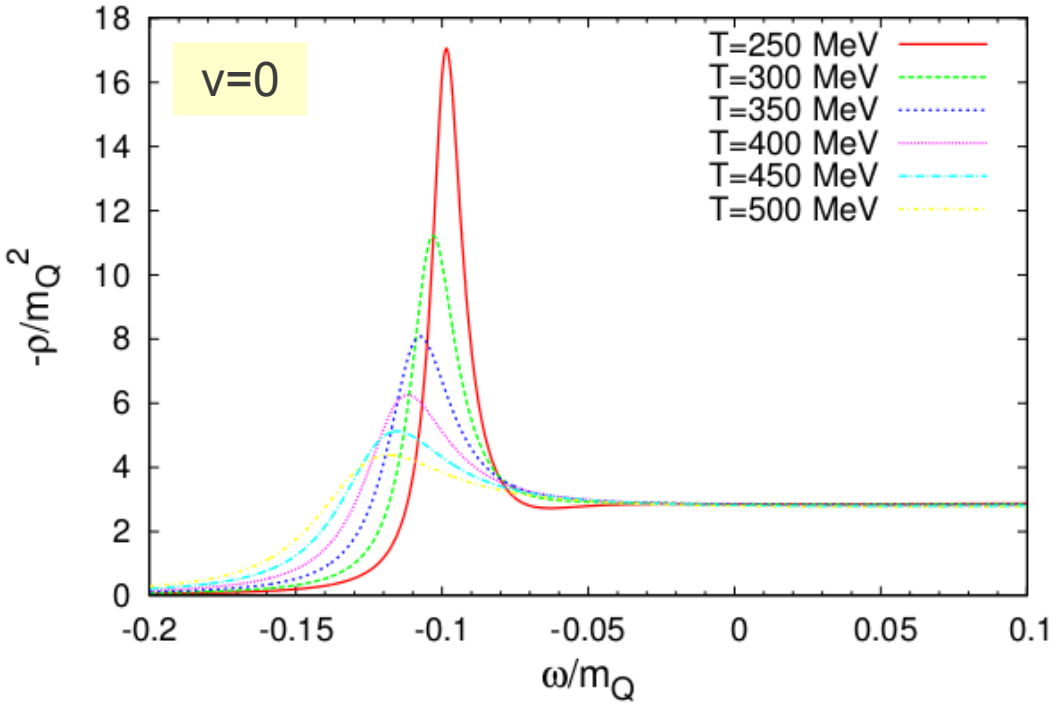
Different behaviour according to temperature scale

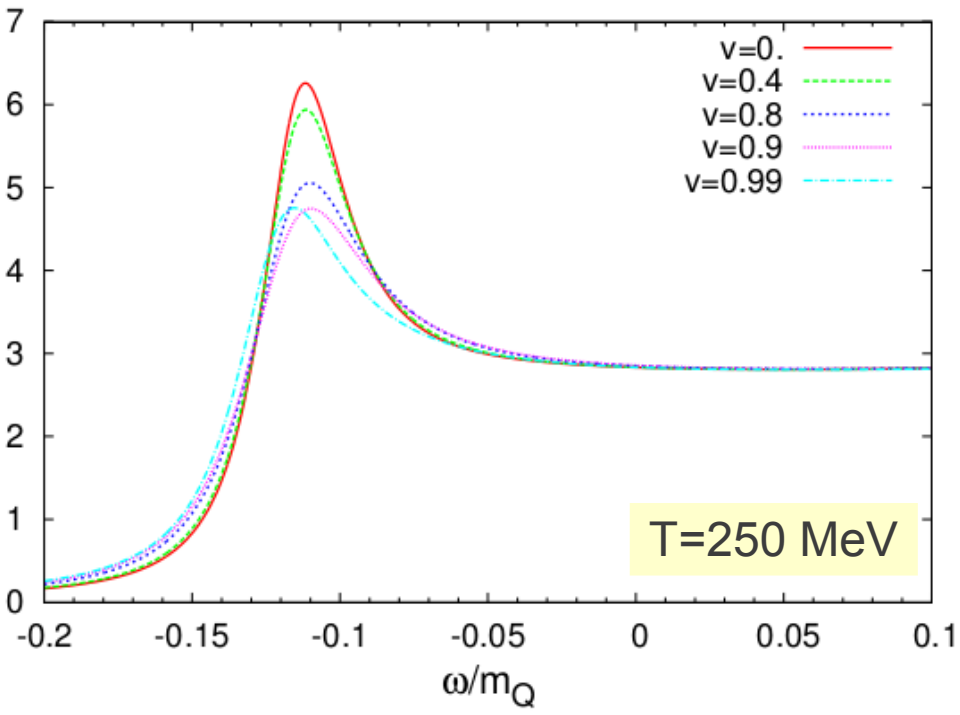
$m_Q \gg 1/r \gg T \gg E \gg m_D$

gluo-dissociation
width decreases with v

$T \gg 1/r\,, m_D \gg E$

Landau damping
width increases with v





Exotic hybrid mesons through AdS/QCD

1^{-+} mesons cannot be described as quark-antiquark states ⟶ exotic states

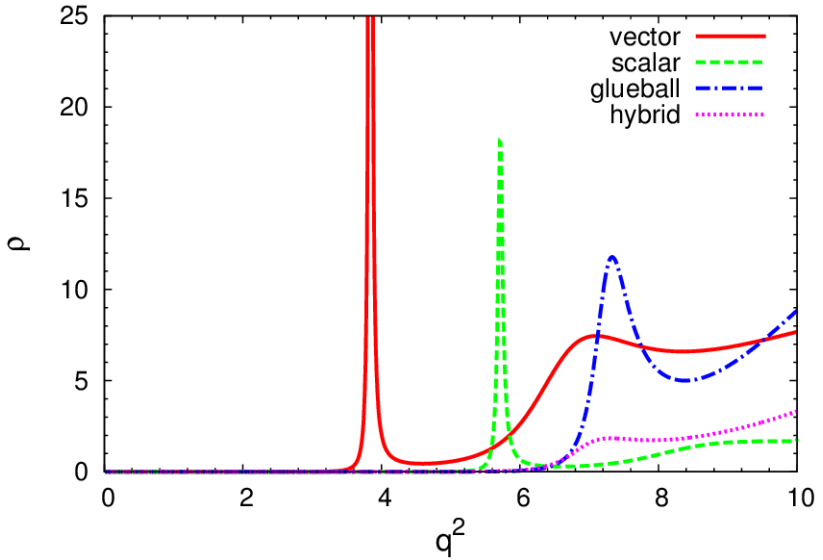
Light meson candidates: $\pi_1(1400),\ \pi_1(1600),\ \pi_1(2015)$

Explore possibility of hybrid meson description, quark + antiquark + excited gluon

$$J^a_\mu = \bar{q} T^a G_{\mu\nu} \gamma^\nu q \quad \Longleftrightarrow \quad \text{dual} \quad \Longleftrightarrow \quad H_\mu = H^a_\mu T^a, \quad m_5^2 R^2 = 8$$

Mass spectrum: $m_n^2 = 4c^2(n+2)$ $\qquad m \sim 1.1$ GeV

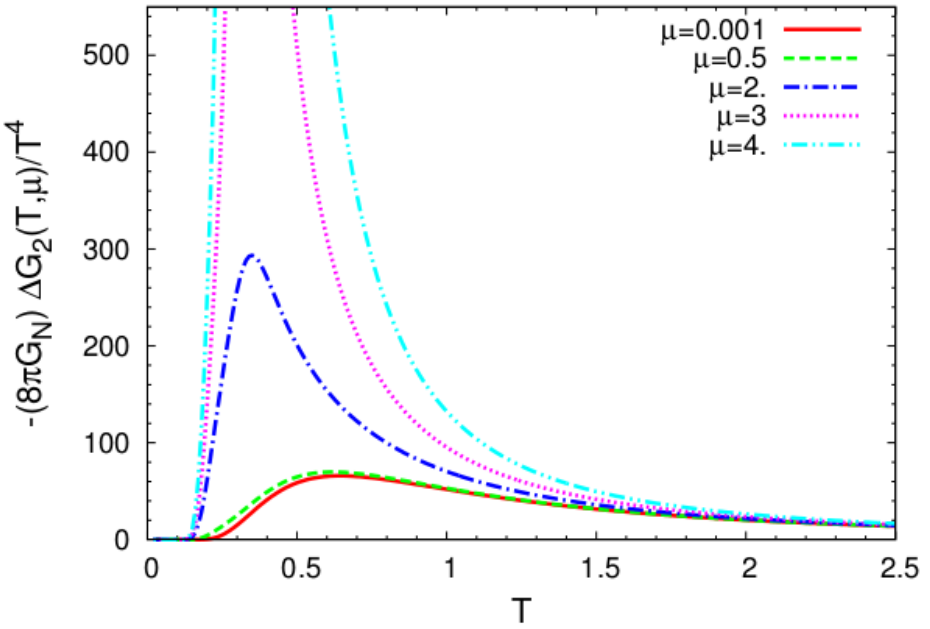
Unstable at finite temperature



In-medium gluon condensate through AdS/QCD

Analysis through the free energy

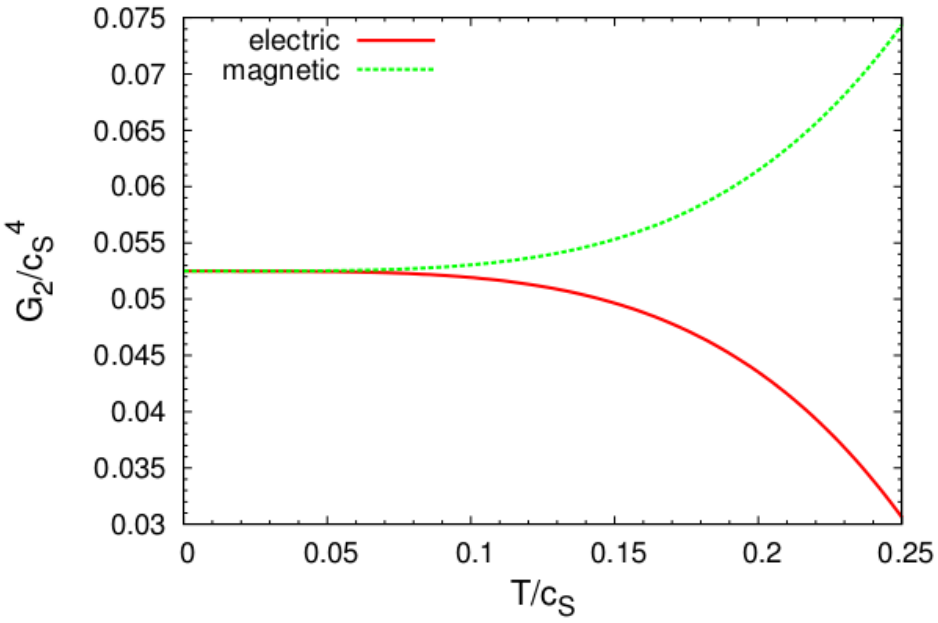
$$p = -\mathcal{F}$$
$$s = \frac{\partial \left[T \log \mathcal{Z}\right]}{\partial T} = \frac{\partial p}{\partial T}$$
$$\rho = \partial p / \partial \mu$$
$$\epsilon = Ts - p + \mu\rho$$
$$\Delta G_2(T,\mu) = -\epsilon(T,\mu) + 3p(T,\mu)$$



Analysis through Wilson loop

$$\log\left(\langle W \rangle\right) = -\sum_n c_n \alpha_s^n - \frac{\pi^2}{36} Z G_2 s^2 + \mathcal{O}(s^3)$$

area of the loop



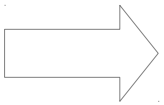
Reconstructing spectral functions through MEM

Problem: we want to invert

$$D(\tau) = \int_{-\infty}^{\infty} K(\tau, \omega)\rho(\omega)d\omega.$$

data: N_c measurements with error matrix $C_{ij} = \frac{1}{N_c(N_c-1)} \sum_{k=1}^{N_c} \left(D_i^k - D_i\right)\left(D_j^k - D_j\right)$

ill defined problem, due to the presence of noise in data and the finite number of datapoints



Minimize χ^2 + Match prior information

$$P[\rho|D, I] = \frac{P[D|\rho]P[\rho|I]}{P[D|I]}$$

Test for MEM through holographic SF