Chiral Density Wave中における $\bar{D}$メソンの分散関係

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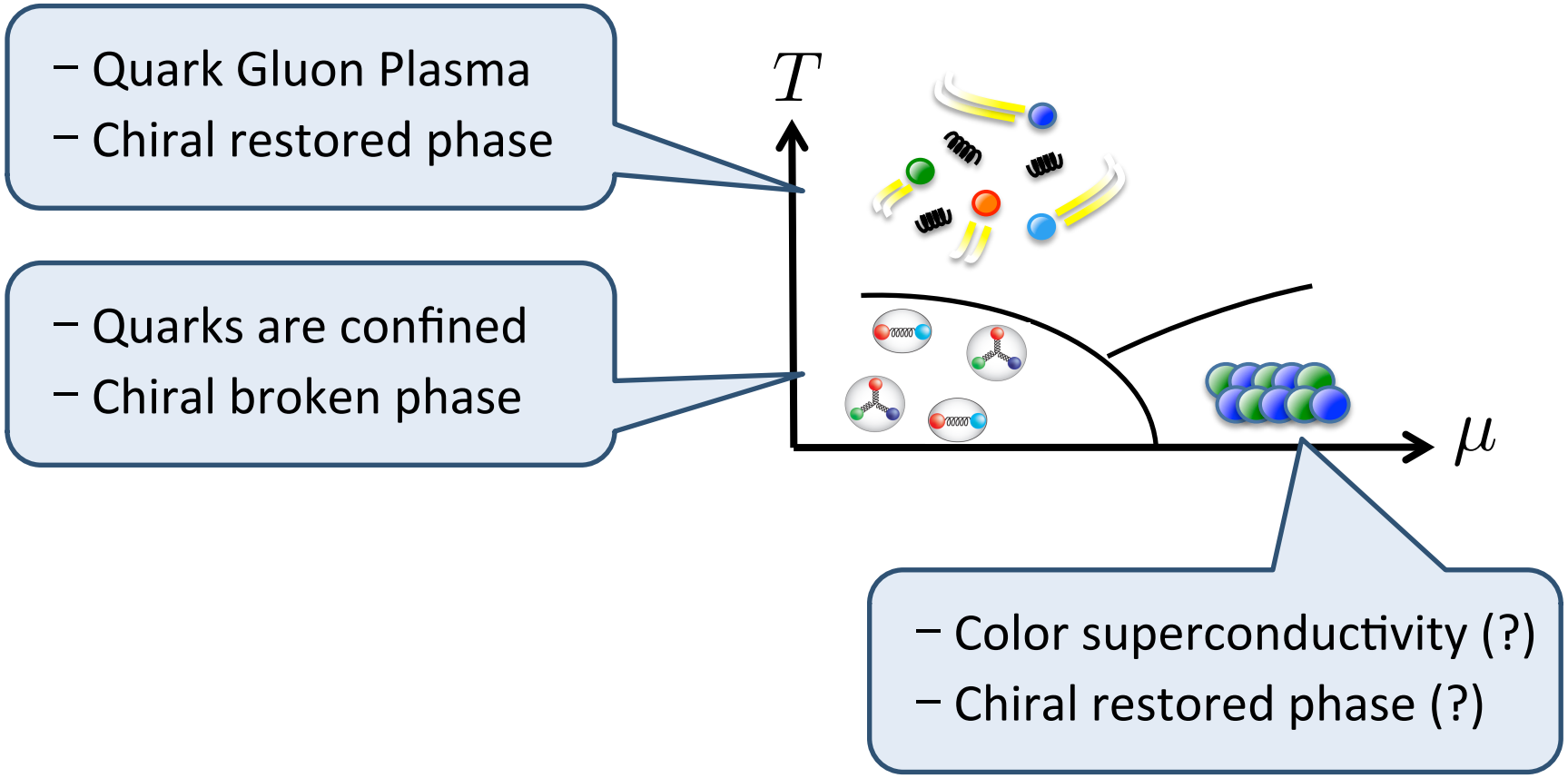
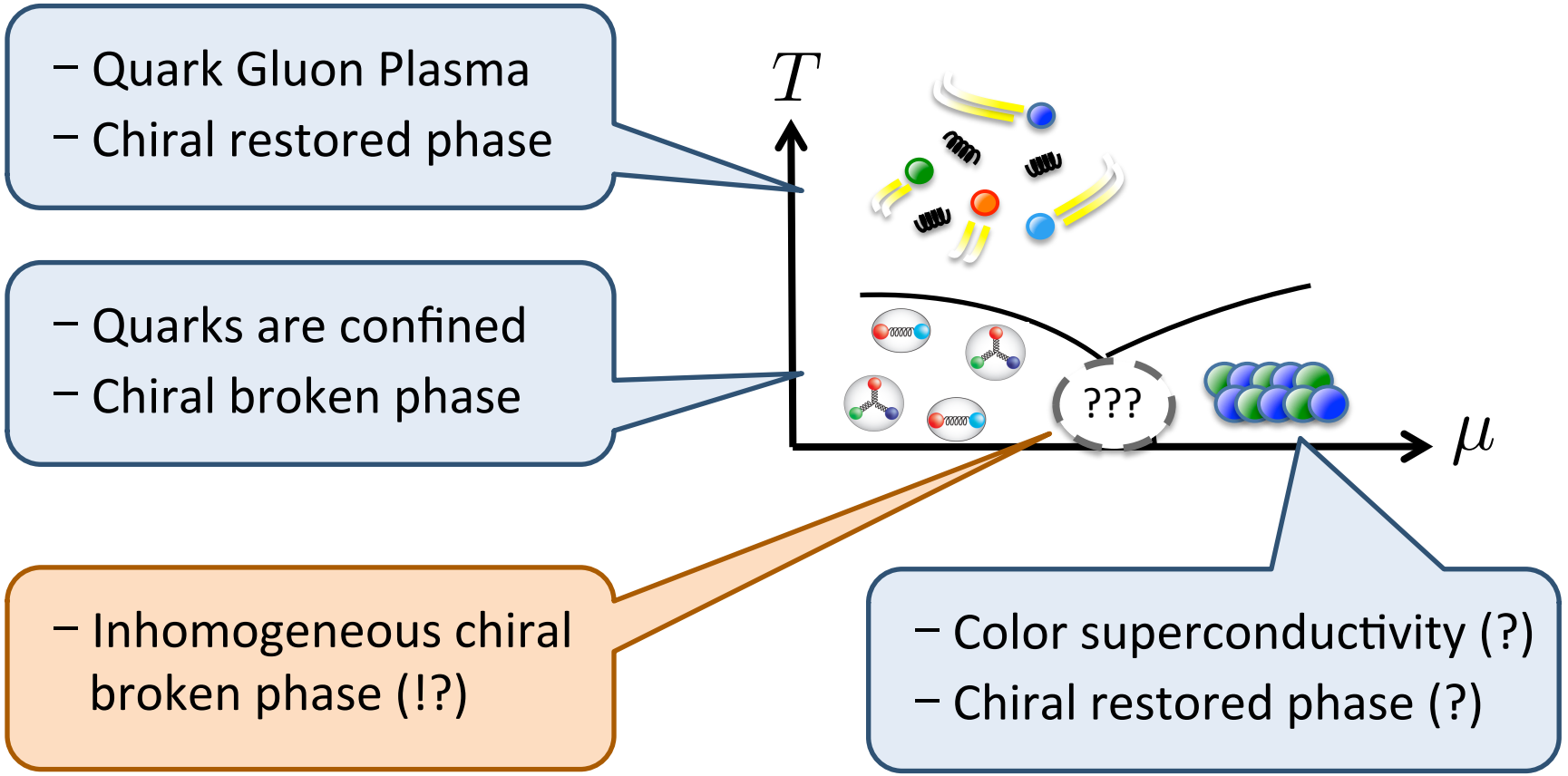
1. Introduction

- **QCD phase diagram**



1. Introduction

- **QCD phase diagram**

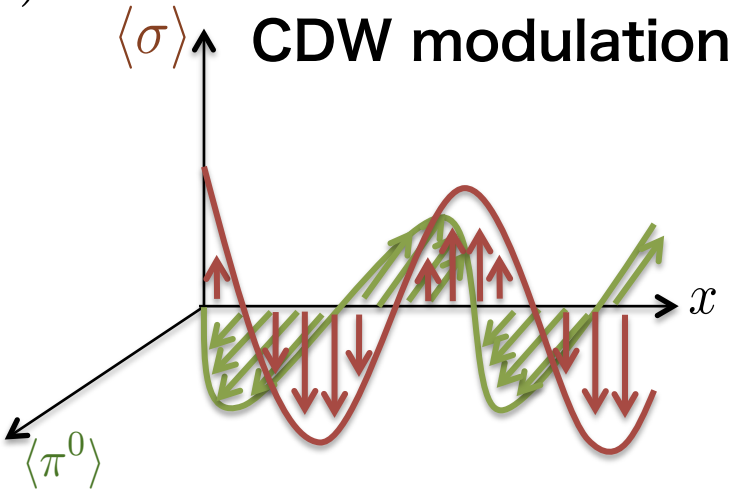


2. Chiral Density Wave phase

- **Chiral Density Wave (CDW)**
  - CDW is one of the inhomogeneous chiral broken phase
  - VEV of Chiral field $M = \sigma + i\tau^a\pi^a$ is expressed as

$$\langle M \rangle = \phi \cos(2fx) + i\phi\, \tau^3 \sin(2fx)$$

  - Neutral pseudo-scalar can condense
  - ϕ measures the magnitude of chiral condensate



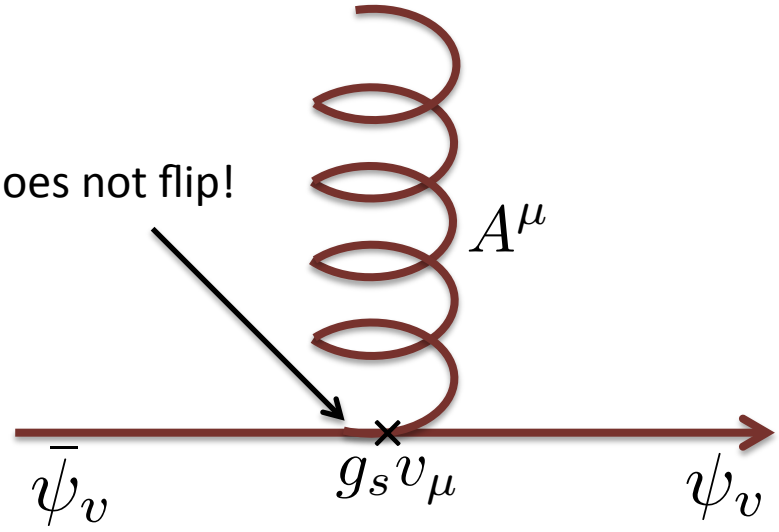
3. Heavy Quarks

- Heavy quarks have large masses compared with QCD scale $\Lambda_{\rm QCD}$, then magnetic gluon does not change the spin of heavy quarks:

$$\mathcal{L} = \bar{\psi}(i\gamma^\mu D_\mu - M_Q)\psi$$
$$= \bar{\psi}_v(iv\cdot D)\psi_v + O(1/M_Q)$$

no γ- matrices !

where $\psi_v = \mathrm{e}^{iM_Q v\cdot x}\dfrac{1+\gamma^\mu v_\mu}{2}\psi$



Spin-up state and spin-down state is independent and equivalent

(Heavy Quark Symmtery)

4. Our study

- Heavy mesons can be good probes to explore the nuclear matter！

- We calculated the dispersion relations for $\bar{D}$ mesons！