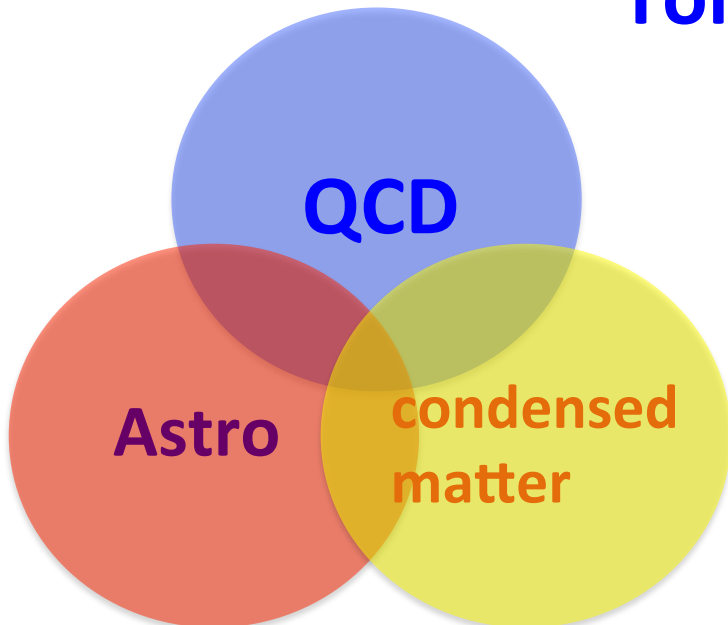


Phenomenological QCD equations of state

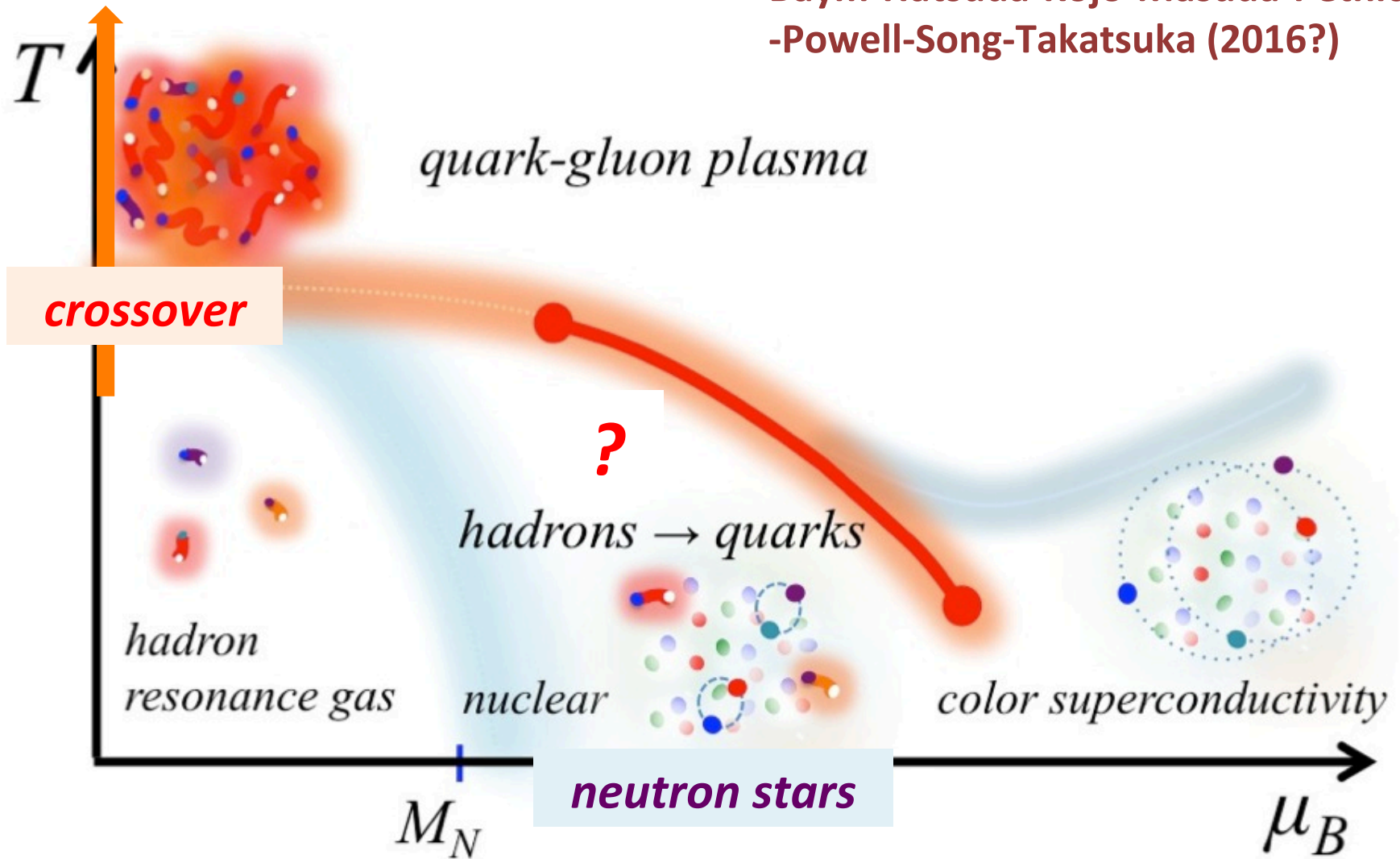
Toru Kojo (CCNU)



- TK, P.D. Powell, Y. Song, G. Baym
1412.1108 [hep-ph] , PRD91, 045043 (2015)
- TK, 1508.1108 [hep-ph], review in EPJA
- K. Fukushima & TK, 1509.1108, APJ817(2016)2
- TK, 1610.05486 [hep-ph]

From review paper by

Baym-Hatsuda-Kojo-Masuda-Pethick
-Powell-Song-Takatsuka (2016?)

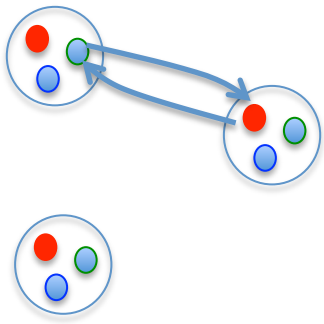


3-window modeling

(Masuda-Hatsuda-Takatsuka 12)

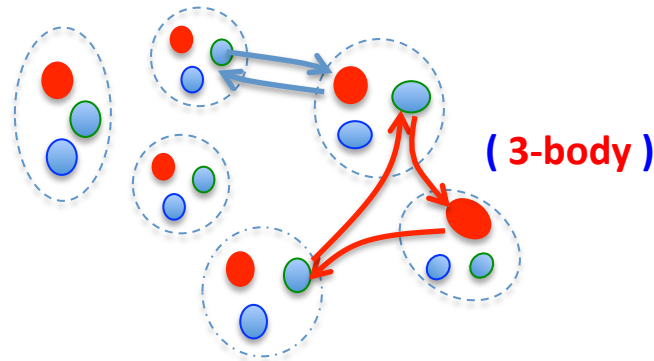
- **few** meson exchange

- nucleons **only**



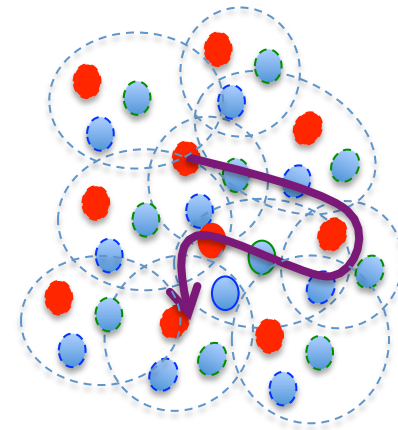
- **many**-meson exchange
(mobility --cf: Karsch-Satz '80)

- **structural change** of hadrons



- **Baryons overlap**

- Quark Fermi sea



→
(pQCD)

APR



Interpolated EoS



Quark models

n_B

$\sim 2n_0$

$\sim 5n_0$

$\sim 100n_0$

will be studied through NS observations

I will discuss

- *Soft* EoS at *small* n_B & *Stiff* EoS at *large* n_B
 - *crossover* or *weak 1st order* *from H to Q*
- Quark matter ($n_B > 5n_0$) *must be* strongly correlated
- Pairing can *stiffen* EoS at *high* density
- Pseudo NG modes as *leading* thermal contributions :
quarks & gluons are all gapped, NG modes also.