

GALILEO GALILEI

(1632)

Dialogue Concerning the Two
Chief World Systems

—Ptolemaic and Copernican

UNIVERSITY OF CALIFORNIA PRESS 1953

A material world in the “old” physics

Renxin Xu (徐仁新)

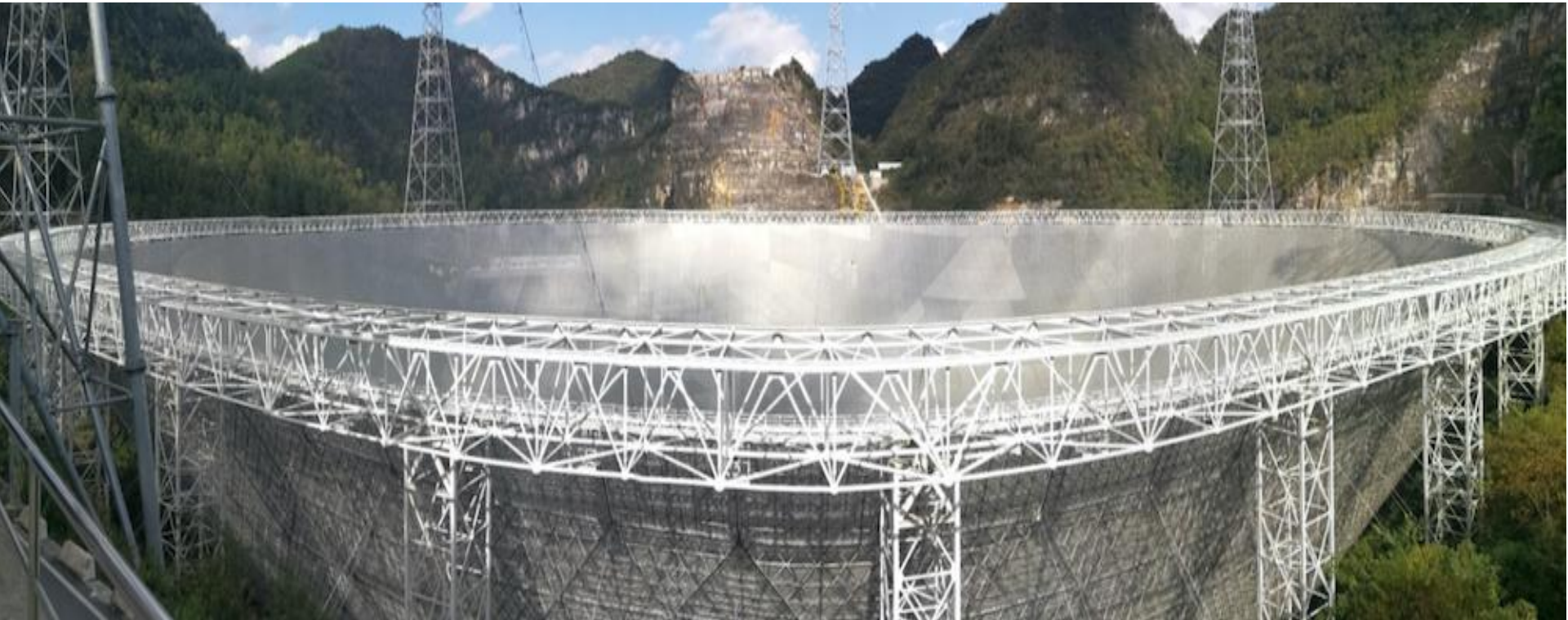
School of Physics/KIAA; PKU; CHINA

(北京大學物理學院)

“Dialogue at the Dream Field: Supranuclear Matter”

FAST-Light Years Away, Guizhou, May 14, 2024

A material world in the “old” physics



<https://psr.pku.edu.cn/conference/fps/ddf/>





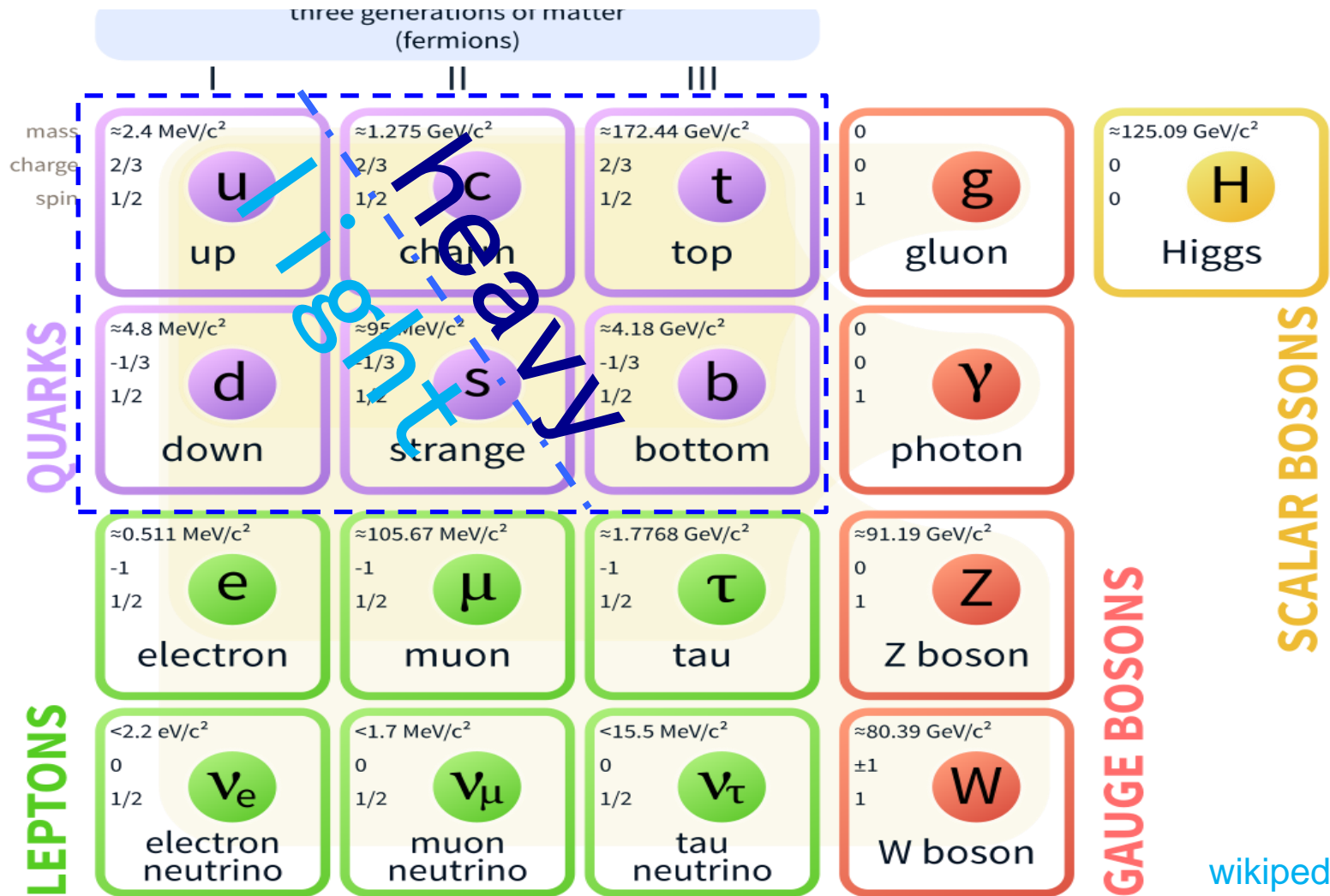
A material world in the “old” physics

Those are *part* of
the material world...

A material world in *the “old” physics*

- and the old physics = standard model of particle physics...

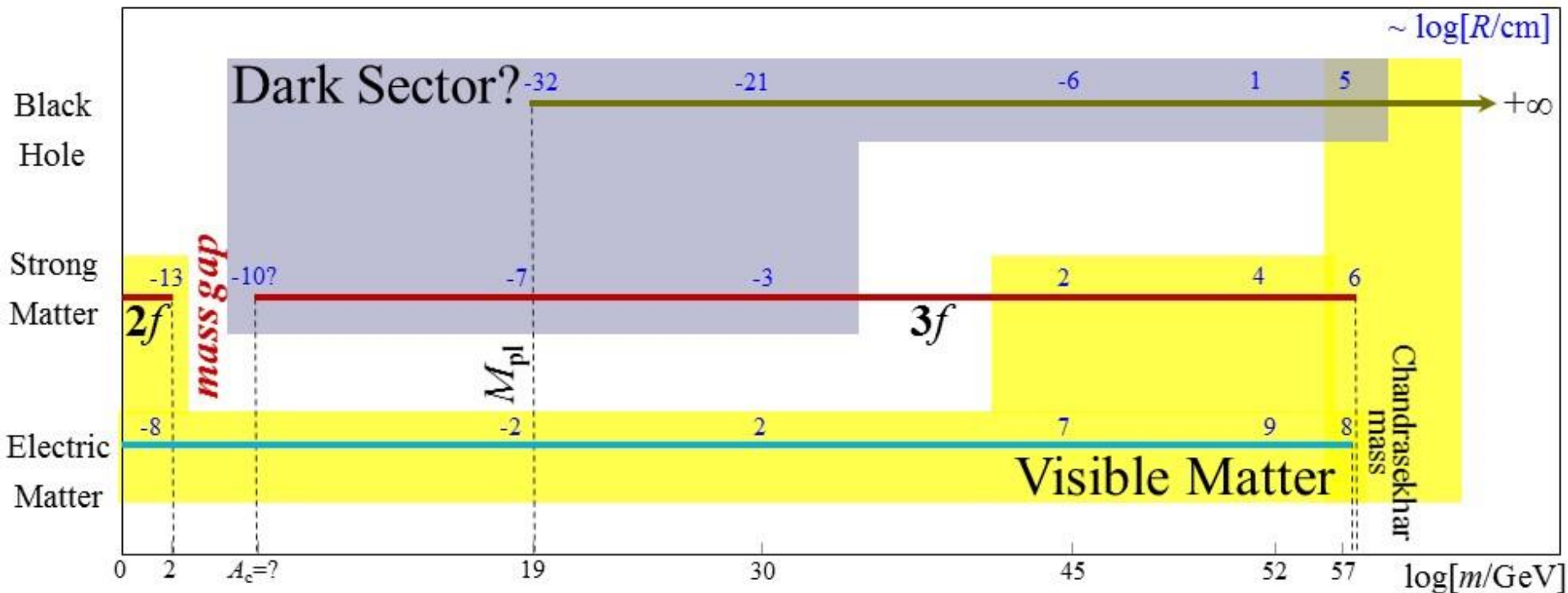
$P = 0 \Rightarrow \ell \sim 0.5 \text{ fm} \Rightarrow$
 $pc \approx \hbar c / \ell \sim 0.5 \text{ GeV!}$



wikipedia.org

A material world in the “old” physics

A world conjectured in the standard model of particle physics: *electric*, *strong*, and *singular*!
 (condensed matter power off, without energy supply)



What is **neutron star**?

(understandable if understanding no *proton star*)

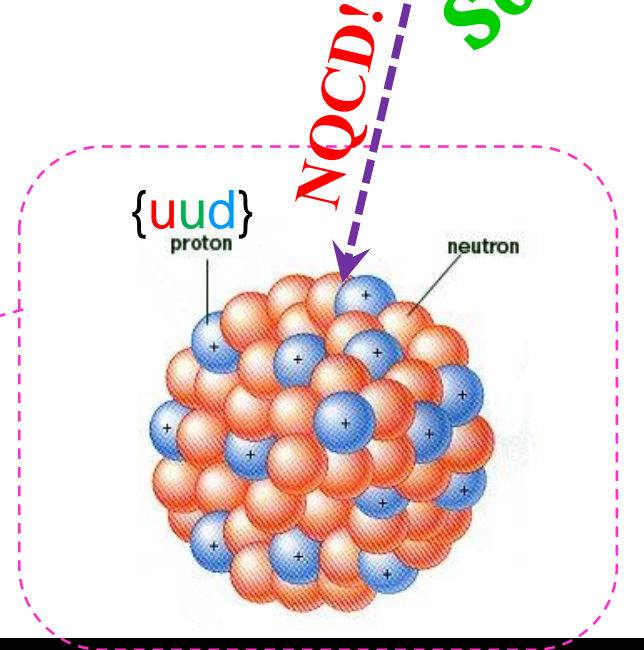
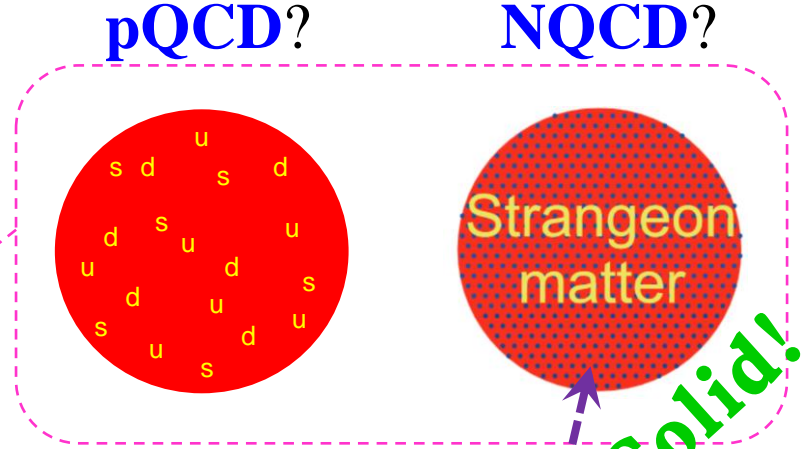
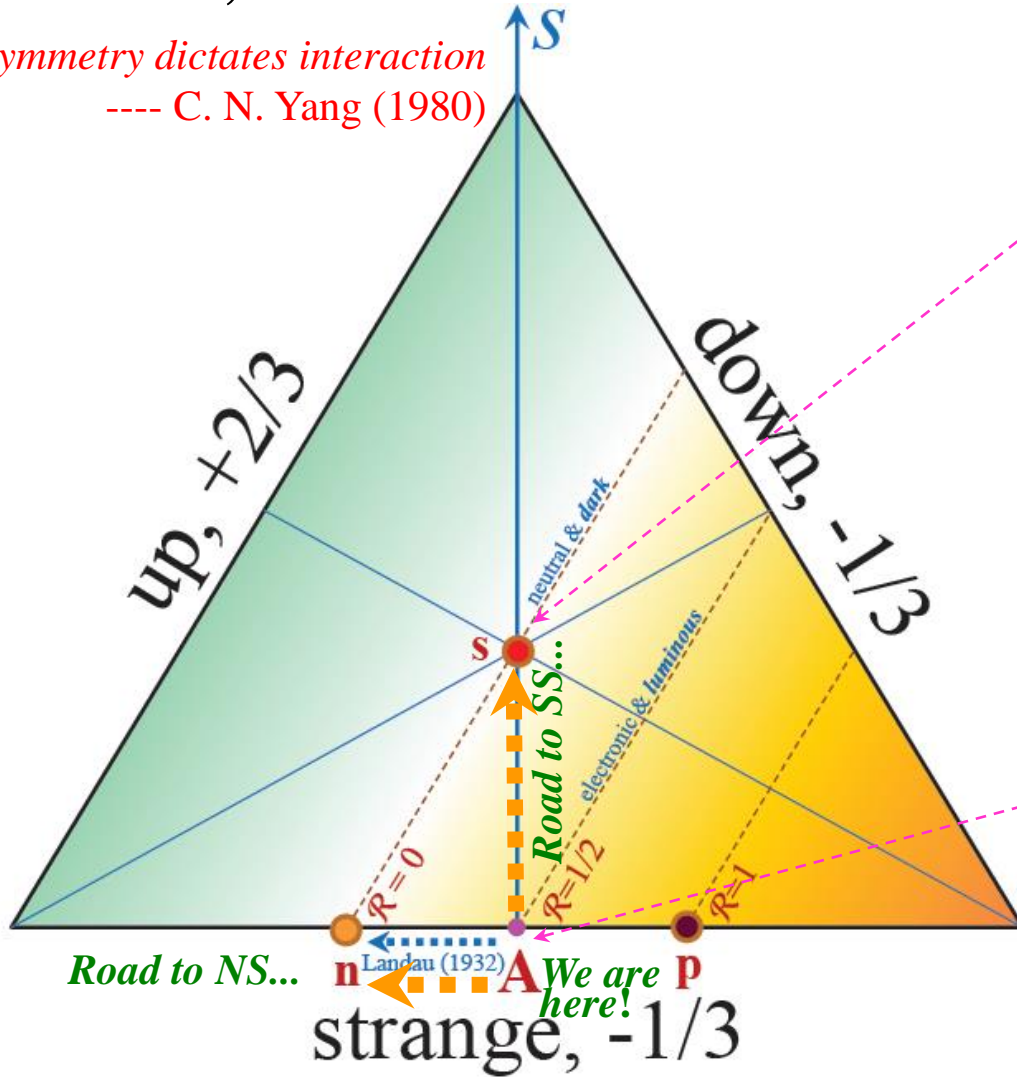
neutron star := flavor-asymmetrical

strange star := flavor-symmetrical

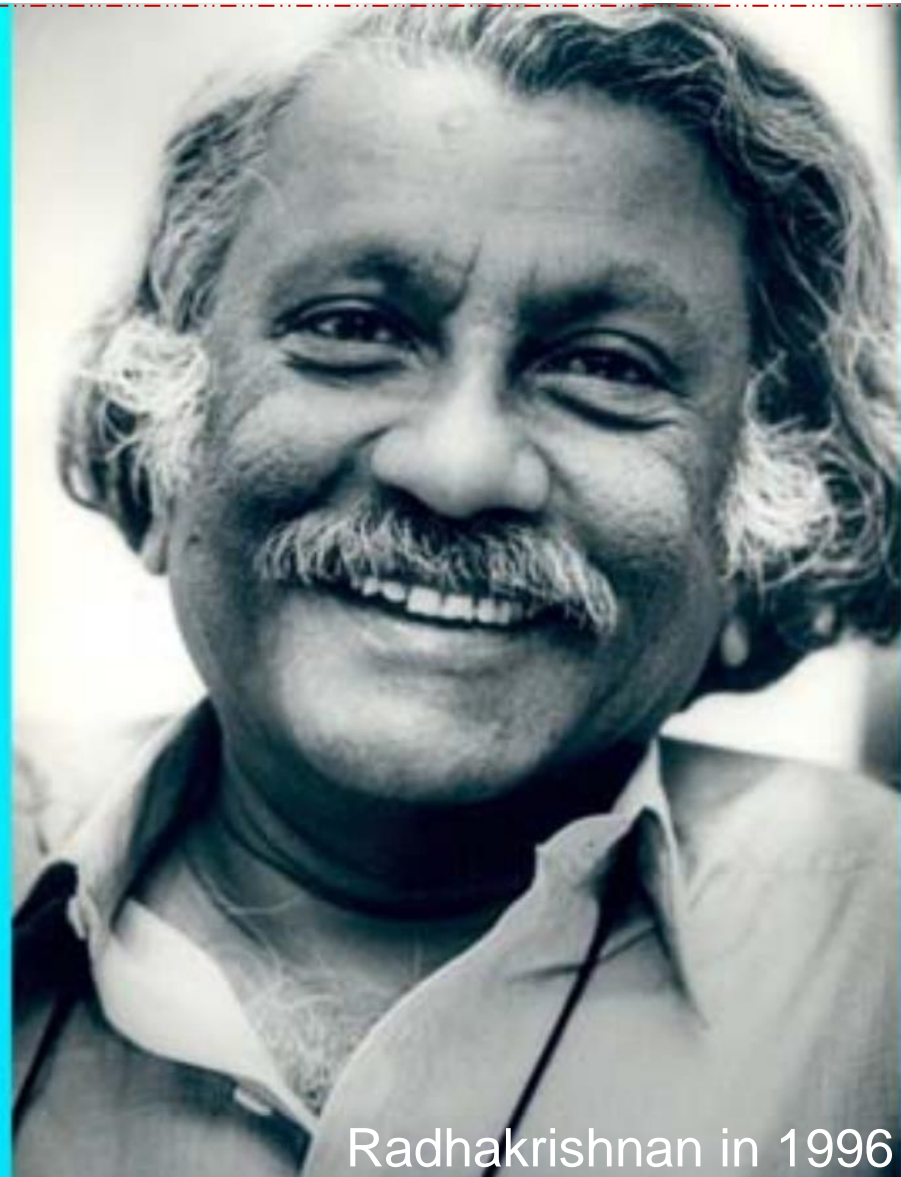
What is neutron star?

- In fact, *neutron* star is *neutral* star...

Symmetry dictates interaction
 ---- C. N. Yang (1980)

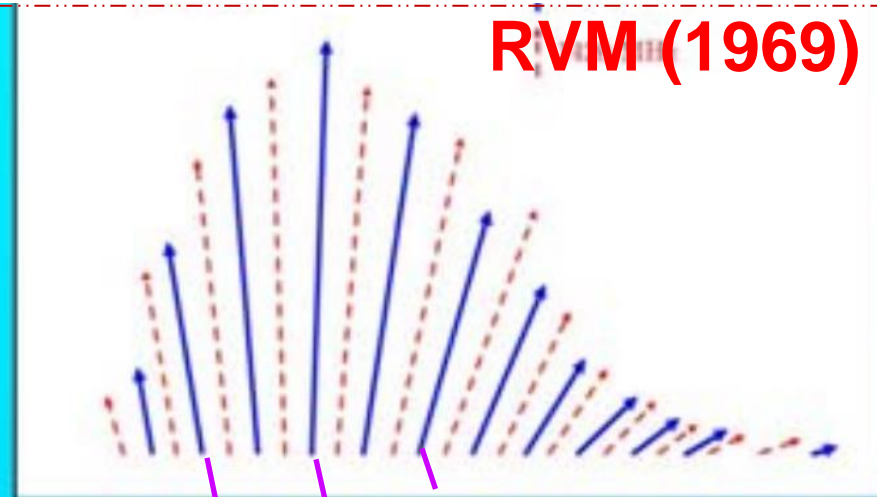


What is neutron star? **FAST**

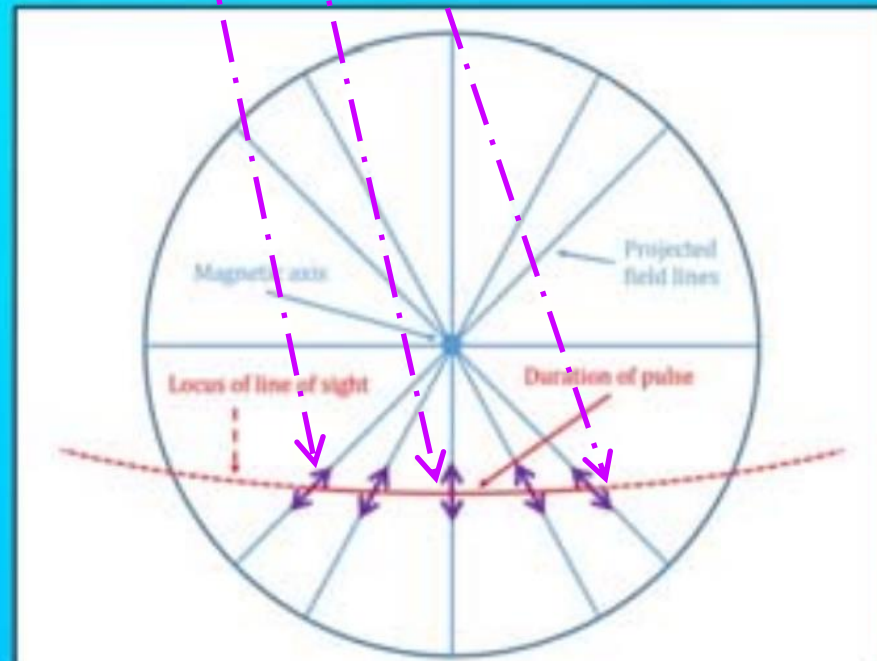


Radhakrishnan in 1996

from Manchester (2017)



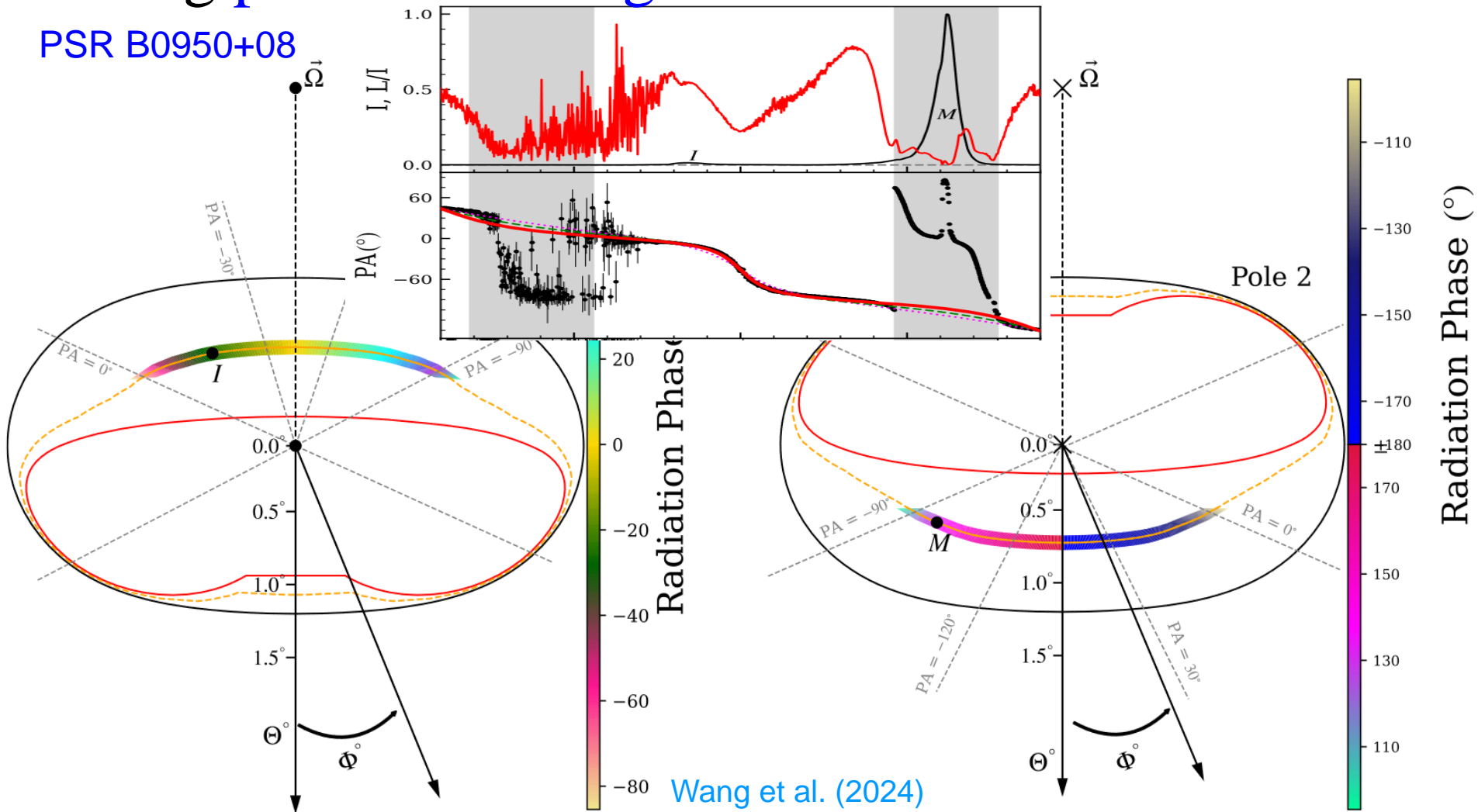
RVM (1969)



What is neutron star? **FAST**

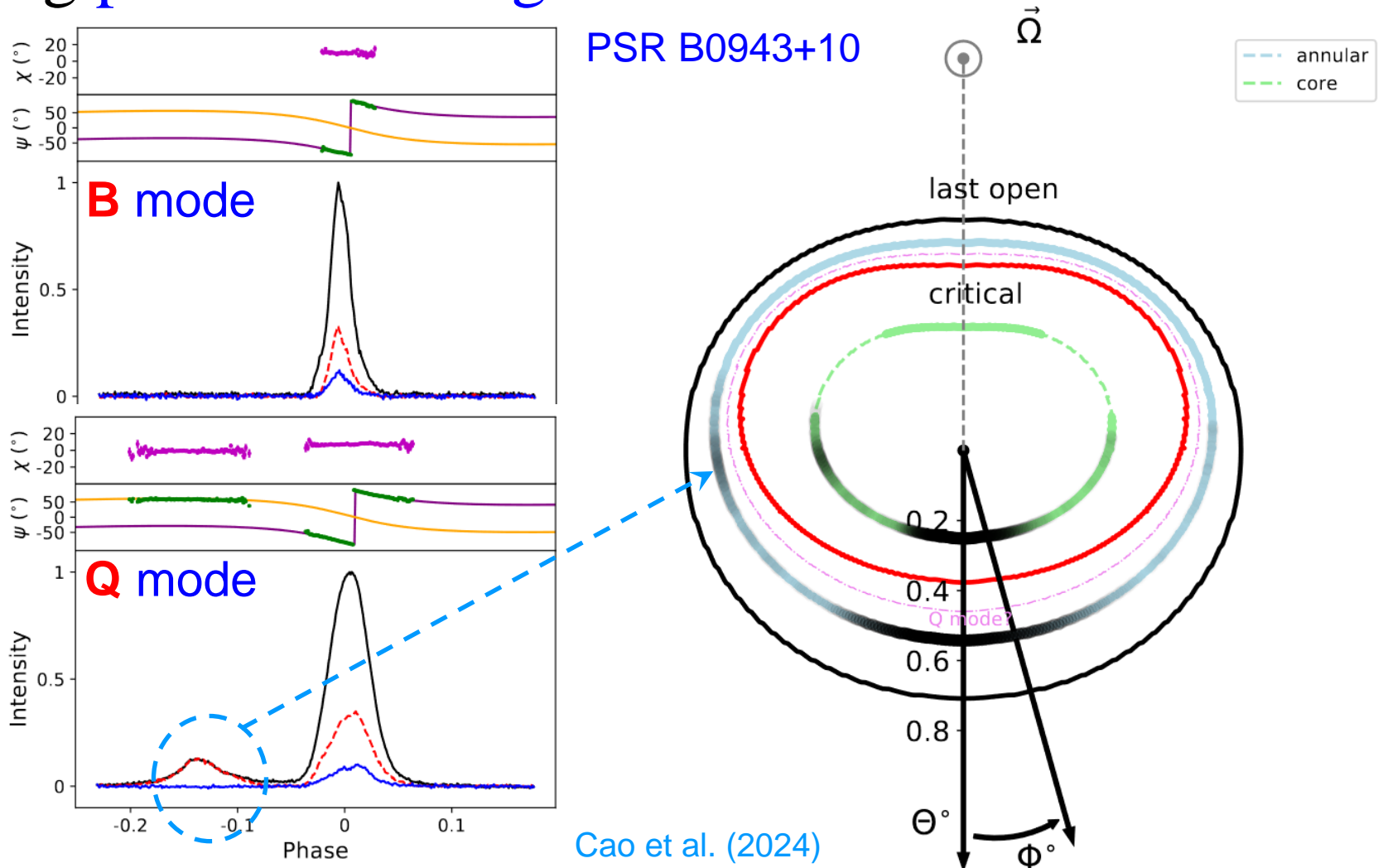
- Strong **particle-binding** and “zits” on PSR surface

PSR B0950+08



What is neutron star? **FAST**

- Strong **particle-binding** and “zits” on PSR surface



What is neutron star? **FAST**

COVER PICTURE

 Free Access

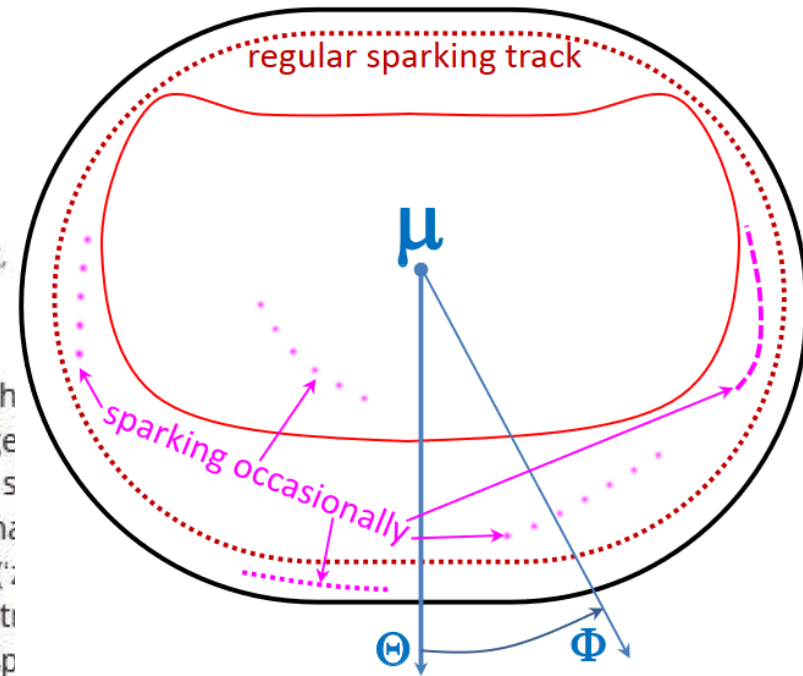
Cover Picture: *Astron. Nachr.* 2/2024

Zhengli Wang, Jiguang Lu, Jingchen Jiang, Shunshun Cao, Weiyang Wang,

e249012 | First Published: 24 March 2024



It has been proposed that the matter could be 'an', strange nucleons but with negative strangeon star should not have to be covered with small hills (zits) spots in this schematic illustration pulsar surface might be responsible magnetospheric activity and the mysterious coherent radio emission, as discussed in the contribution by Xu and Wang, this issue, p. e230153. Zits may also be responsible for the significantly non-symmetrical sparking discovered in the 110-min polarization observation of pulsar PSR B0950+08 targeted with China's Five-hundred-meter Aperture Spherical radio Telescope, FAST. Details can be found in the contribution by Wang et al., this issue, e240010.



A nucleon-strangeon *membrane*?

2

- Meaningful for SNE, GRB/FRB, merge, even ULX...
(*strangeon magnetar*? Xu&Busse2001, $E_{\text{mag}} \sim E_{\text{elast}}$?)

1

Electric Matter (made of nuclei and electrons)

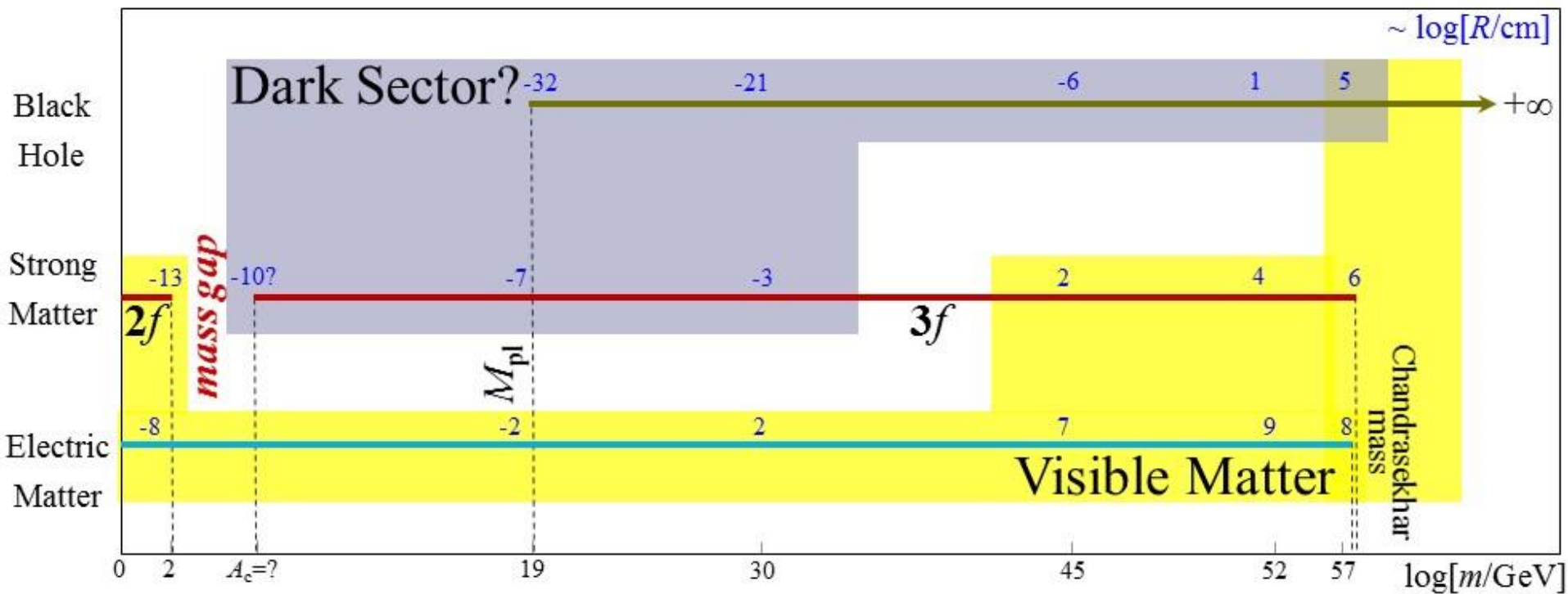
Membrane-like surface

Strong Matter (made of strangeons?)

Summary

Summary

A material world in the “old” physics World...
 (condensed matter power off, without energy supply)



THANKS!