Gravitational Waves & Neutron Stars
- Discussion Session -

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1. **Jo van den Brand: “Gravitational waves measurements”**
2. **Luciano Rezzolla “From gravitational-wave spectroscopy to nuclear EOS”**
3. **Thomas Klaehn: “Strange-quark matter in neutron stars?”**
4. **Stefan Schramm: “Dense and warm matter in compact stars ...”**
5. **David Blaschke:”Discussion”**

17th International Conference on
Strangeness in
Quark Matter

Universiteit Utrecht
10-15 July 2017
Utrecht, the Netherlands

Utrecht 2017

JINR DUBNA

NATIONAL RESEARCH NUCLEAR UNIVERSITY • MOSCOW ENGINEERING PHYSICS INSTITUTE • MEPhI

Uniwersytet Wrocławski

RSF Russian Science Foundation

Discussion:

H. Stroebele: How likely is it that s-quarks (and no s-bar) exist and survive in neutron stars in a QGP or in hyperons. How large is then the ratio s/(u+d) in neutron stars and in the universe?

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It is not impossible that there is no strangeness in the Universe except for particle collision Experiments! See talk by T. Klaehn

Arguments:
Onset of hypernuclear matter could be preceeded by that of (two-flavor) quark matter.
Strange quarks are likely to appear sequentially (at T=0) due to their larger mass.
Once strangeness degree of freedom appears in quark matter, the EoS is softened and compact stars become unstable against gravitational collapse.

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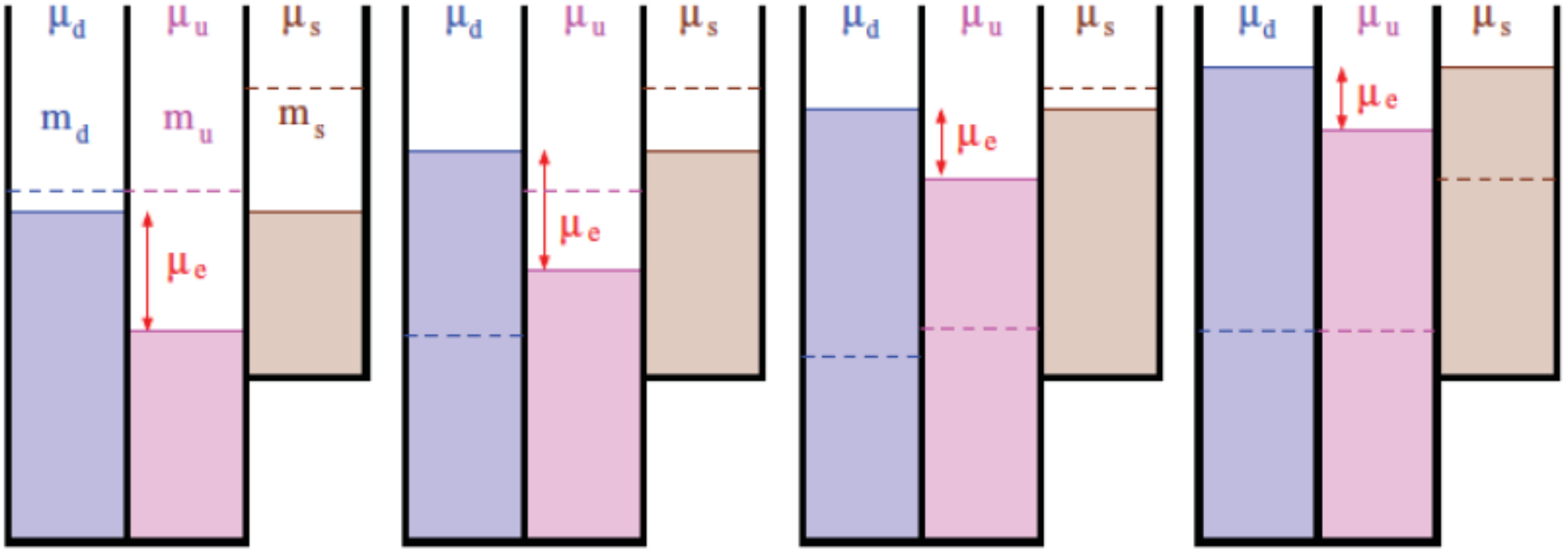
There could also be single flavor quark matter, mixed with nuclear matter (d-quark dripline)

Increasing density →



D.B., F. Sandin, T. Klaehn, J. Berdermann, PRC 80 (2009) 065807

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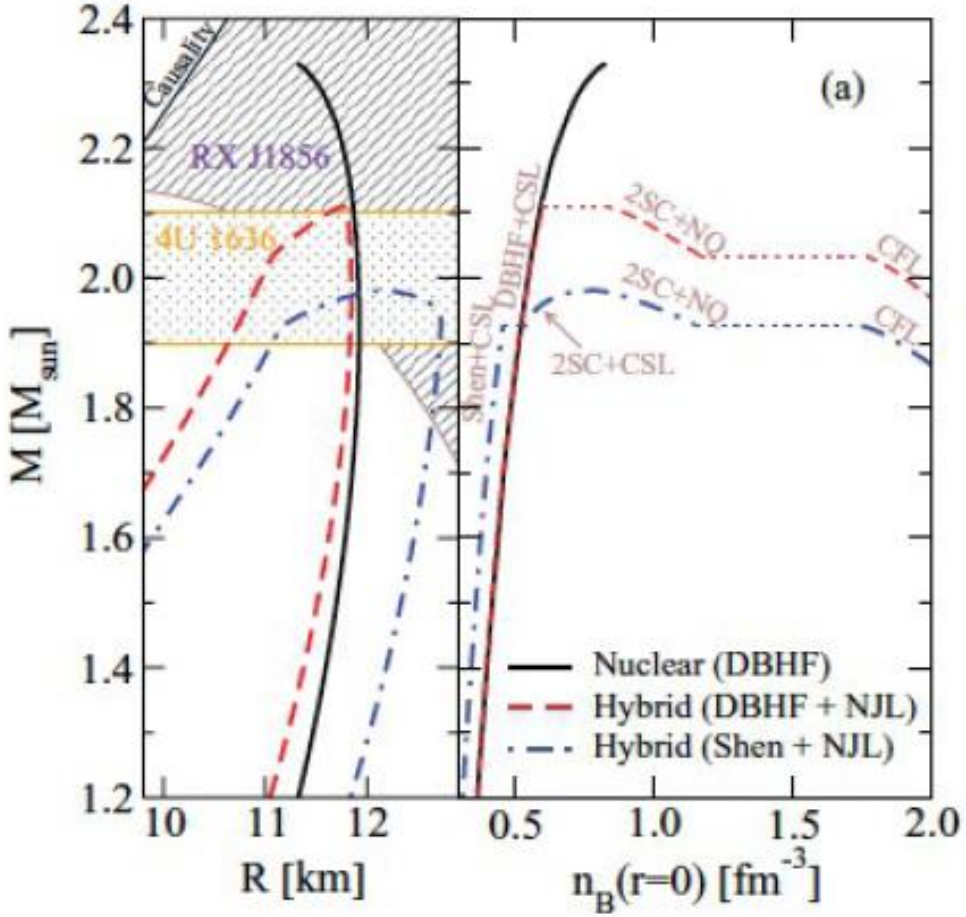

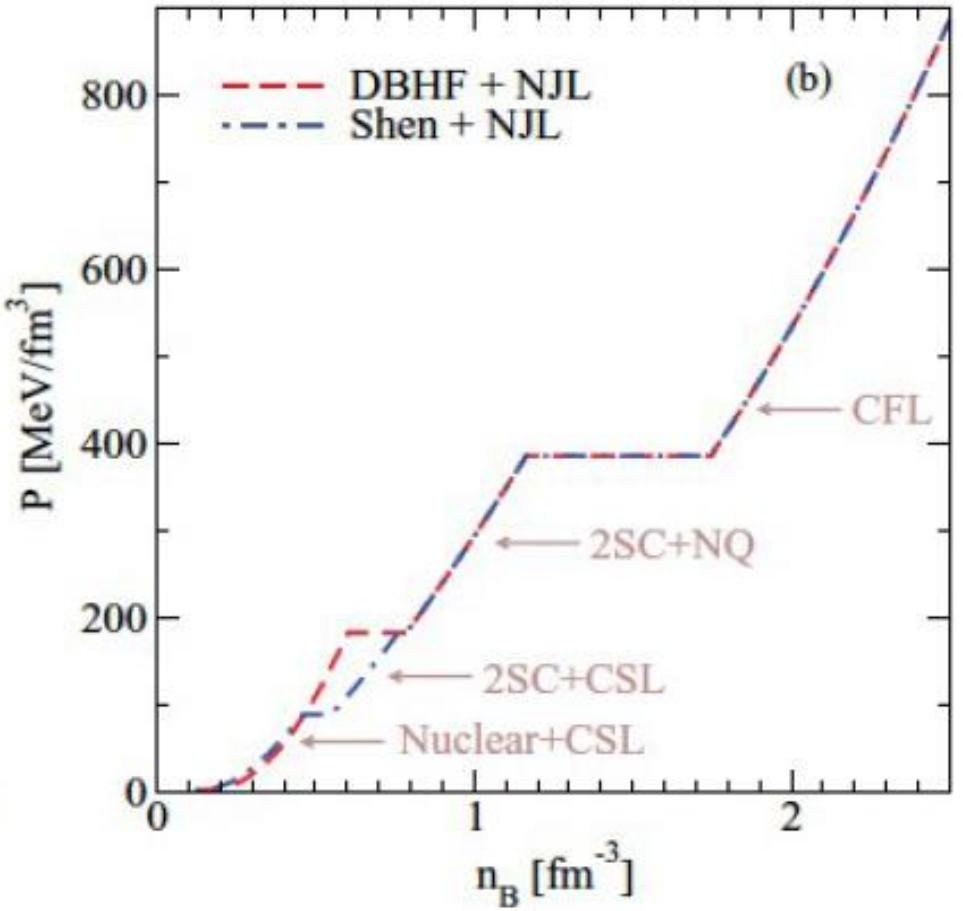

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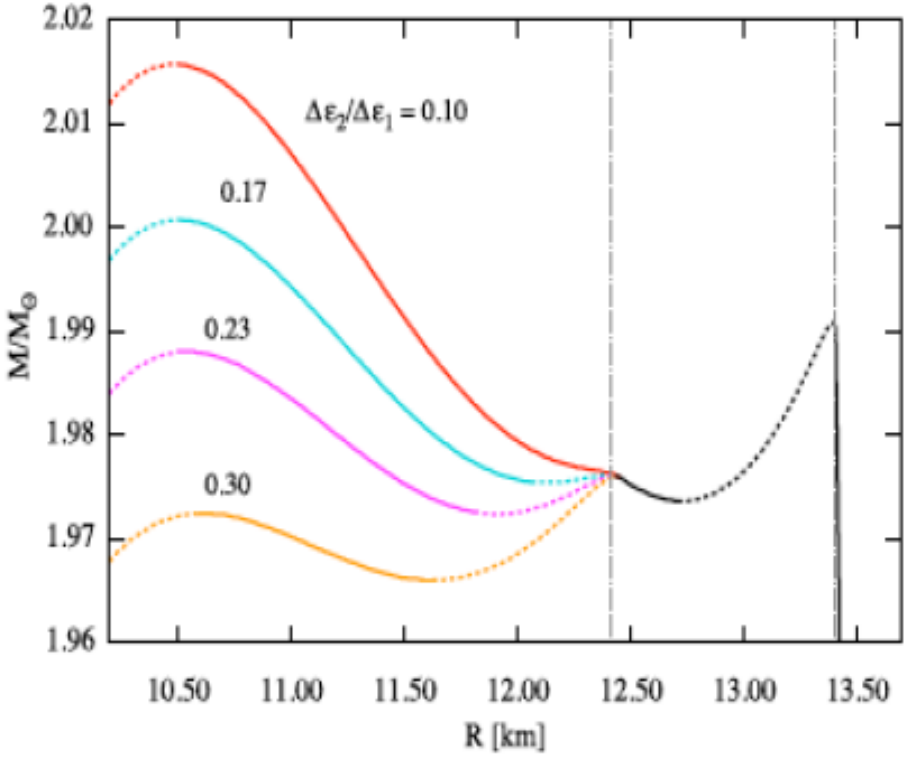
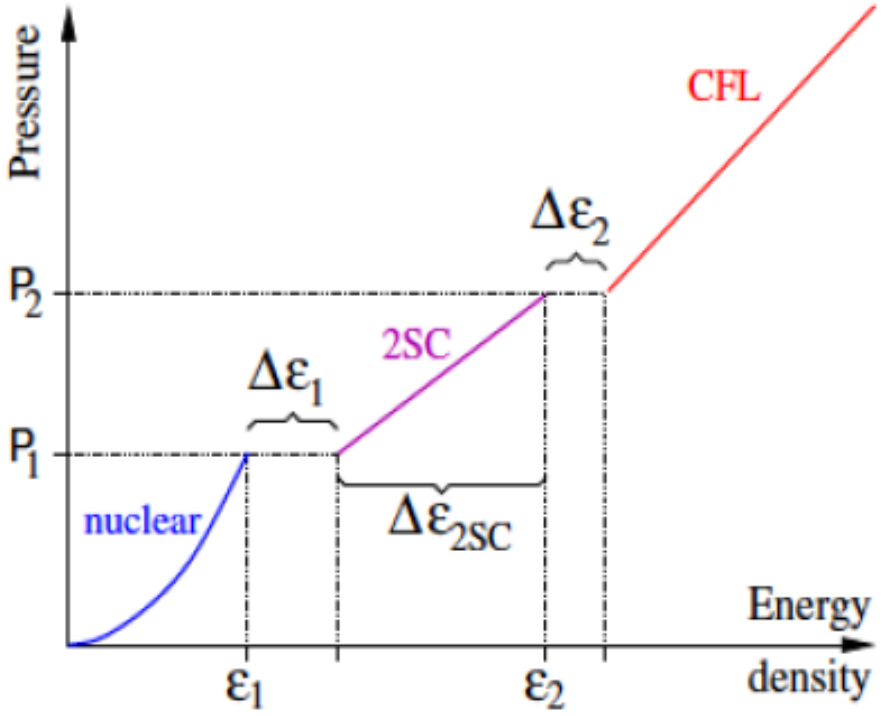
Discussion:

Measuring Mass vs. Radius ⟷ Equation of state





High-mass twins:
D. Blaschke et al., PoS CPOD 2013
S. Benic et al., A&A 577 (2015) A50

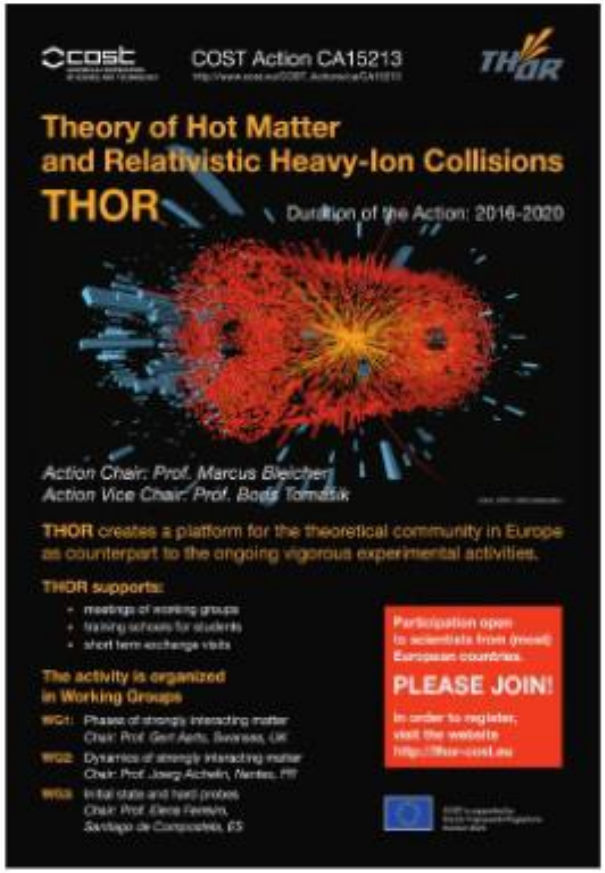
High-mass triples:
M. Alford and A. Sedrakian, arxiv:1706.01592

Advertisement:

- **THOR EU COST Action CA15213**
  - Theory of Hot Matter and Relativistic Heavy Ion Collisions
    http://thor-cost.eu

- **NewCompStar EU COST Action MP1304**
  - Theory of Compact Stars (ending 2017)
    http://compstar.uni-frankfurt.de

- **PHAROS EU COST Action CA16214**
  - The multi-messenger physics and astropysics of neutron stars



6th International Workshop on

Compact Stars in the QCD Phase Diagram VI

(Cosmic matter in heavy-ion collision laboratories?)

Dates: 26.-29. September 2017
Venue: Dubna, Russian Federation
Organizers: D. Blaschke, H. Grigorian
Website: http://www.quarknova.ca/CSQCD.html
http://theor.jinr.ru/meetings/2017 (t.b.u.)

Previous meetings:
Copenhagen (2001), Beijing (2009), Guaruya (2012), Prerow (2014), Gran Sasso (2016)

Topics:
- QCD phase diagram for HIC vs. Astrophysics
- Quark deconfinement in HIC vs. supernovae, neutron stars and their mergers
- Strangeness in HIC and in compact stars
- ...