Reconstruction of nuclear matter parameters in a Bayesian approach

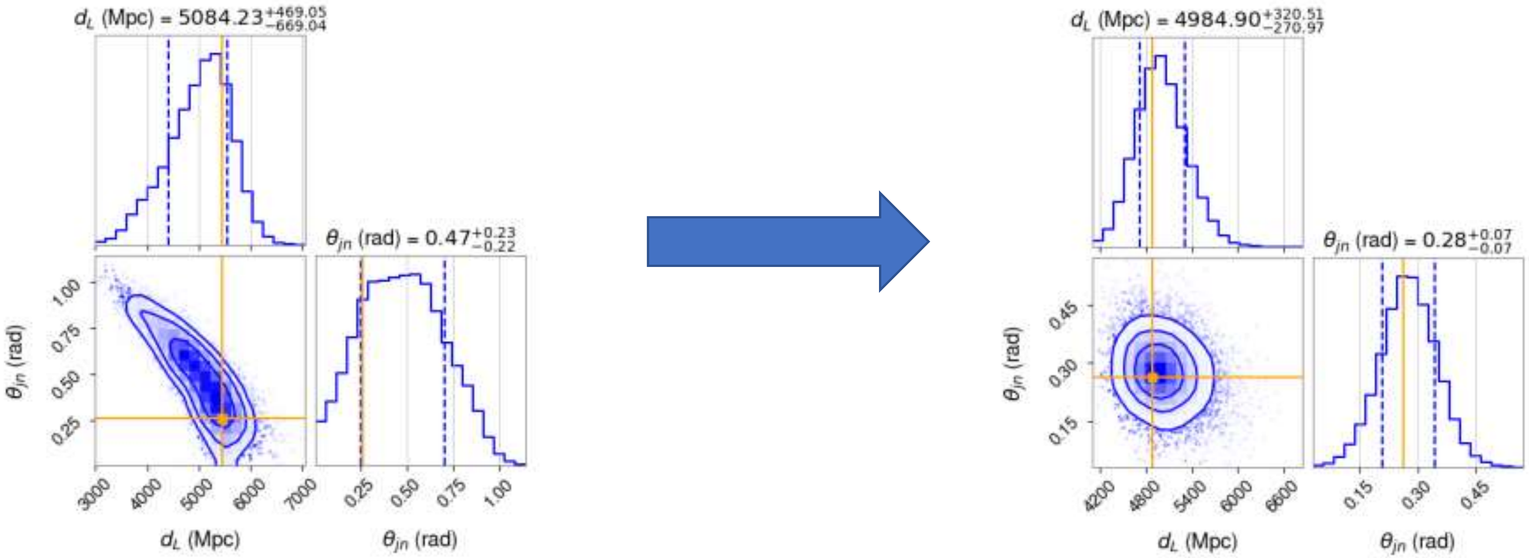
Sk Md Adil Imam, B.K. Agrawal

Summary : It is very hard to extract the NMPs due to the correation of symmetry energy with the SNM and asymmetry parameter.

BREAKING THE DISTANCE-INCLINATION DEGENERACY IN PRECESSING COMPACT BINARIES

Francesco Crescimbeni[1,2], Francesco Pannarale[1,2], Paolo Pani[1,2], Adriano Frattale Mascioli[1,2]
[1] *Dipartimento di Fisica, Università di Roma La Sapienza, Piazzale A. Moro 5, I−00185, Roma, Italy*
[2] *INFN Sezione di Roma, Piazzale A. Moro 5, I−00185, Roma, Italy*

Some parameters of GW signal from compact binary systems are challenging to determine with Bayesian inference. An example is given by the luminosity distance d_L and the inclination angle Θ_{JN}.



The degeneracy in the joint posterior $p(d_L, \Theta_{JN}|s)$ and the geometry of the detector network can cause the posterior to not be centered around the true values of distance and inclination. Spin precession effects in the dynamics of the binary can allow for better measurements of distance and inclination.

GwsNS school Poster Session

Thomas Hussenot-Desenonges, IJCLab

The GRANDMA Analysis of GRB221009A

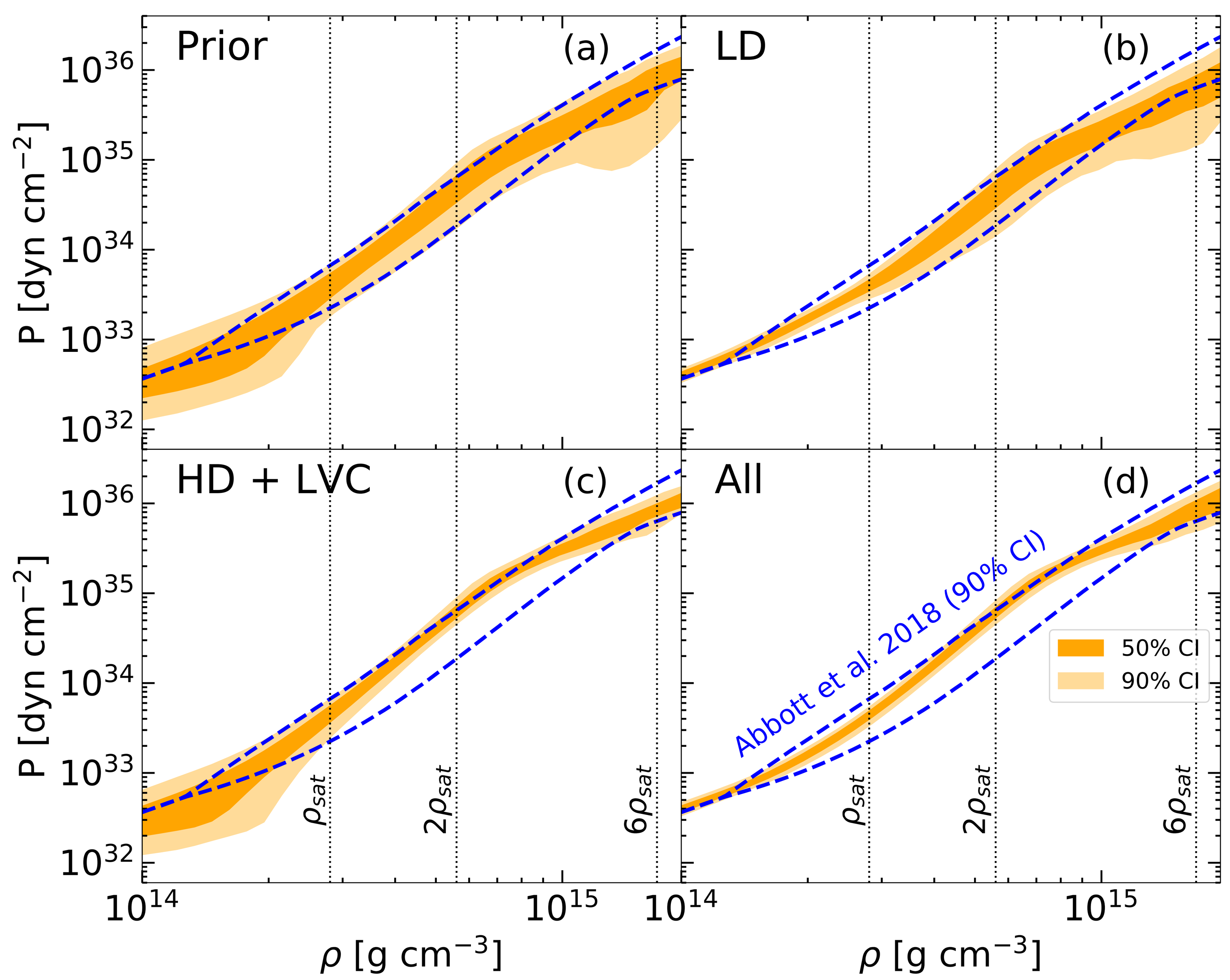
My PhD work is centered around the optical followup of GW events and GRBs, analysing telescope images and exploiting the obtained lightcurves.

GRB221009A, “The B.O.A.T”, was an exceptional event, warranting many observations of its afterglow, and it allowed the GRANDMA collaboration to challenge our image reduction software and parameter estimation tools.

DINH THI Hoa
Supervisors: Francesca GULMINELLI and Anthea F. FANTINA
Email: dinh@lpccaen.in2p3.fr

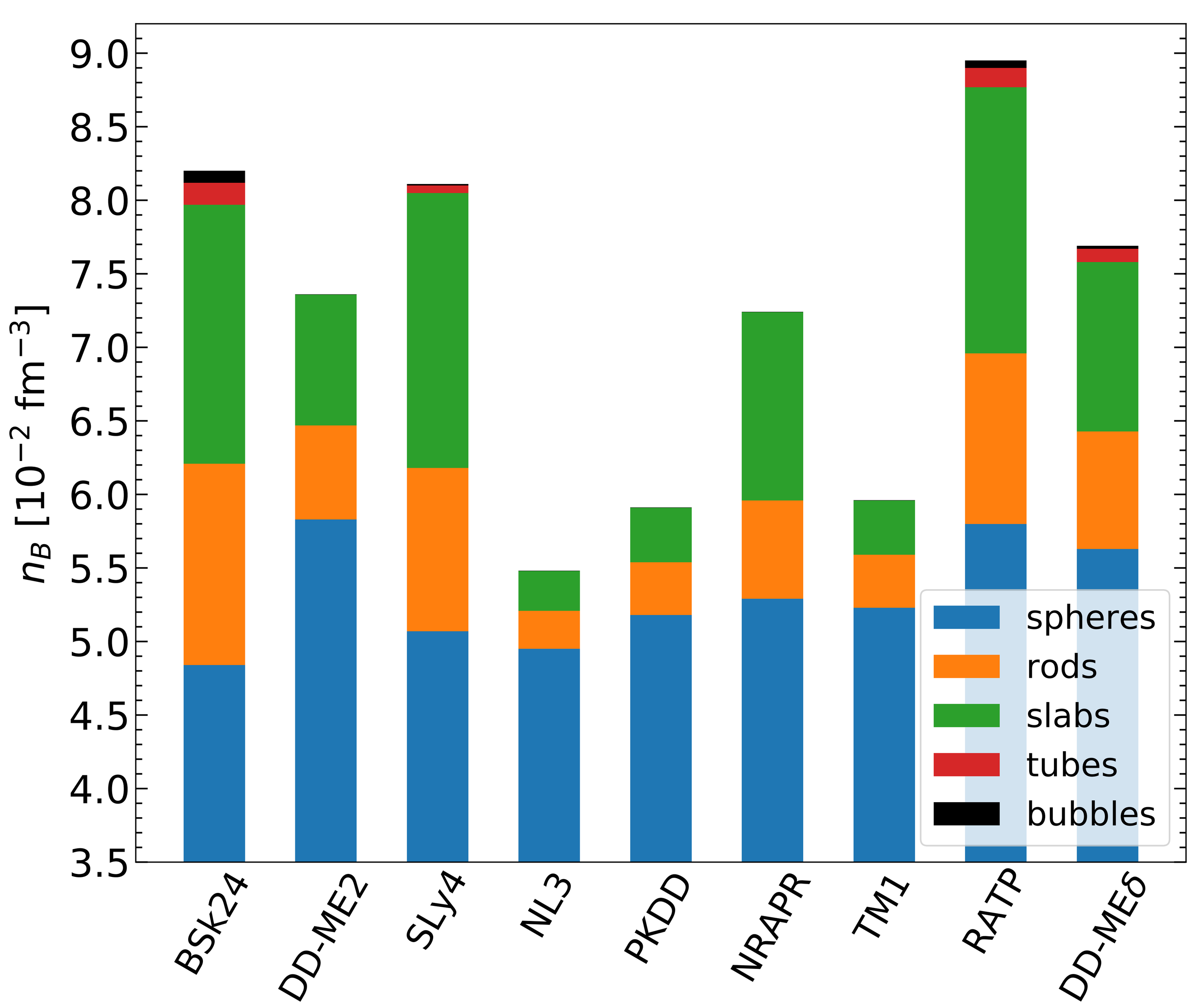
Unified EOS for cold–catalyzed neutron stars

Constraining NS EOS using information from nuclear physics and NS observations (mass, radius, and tidal deformability).



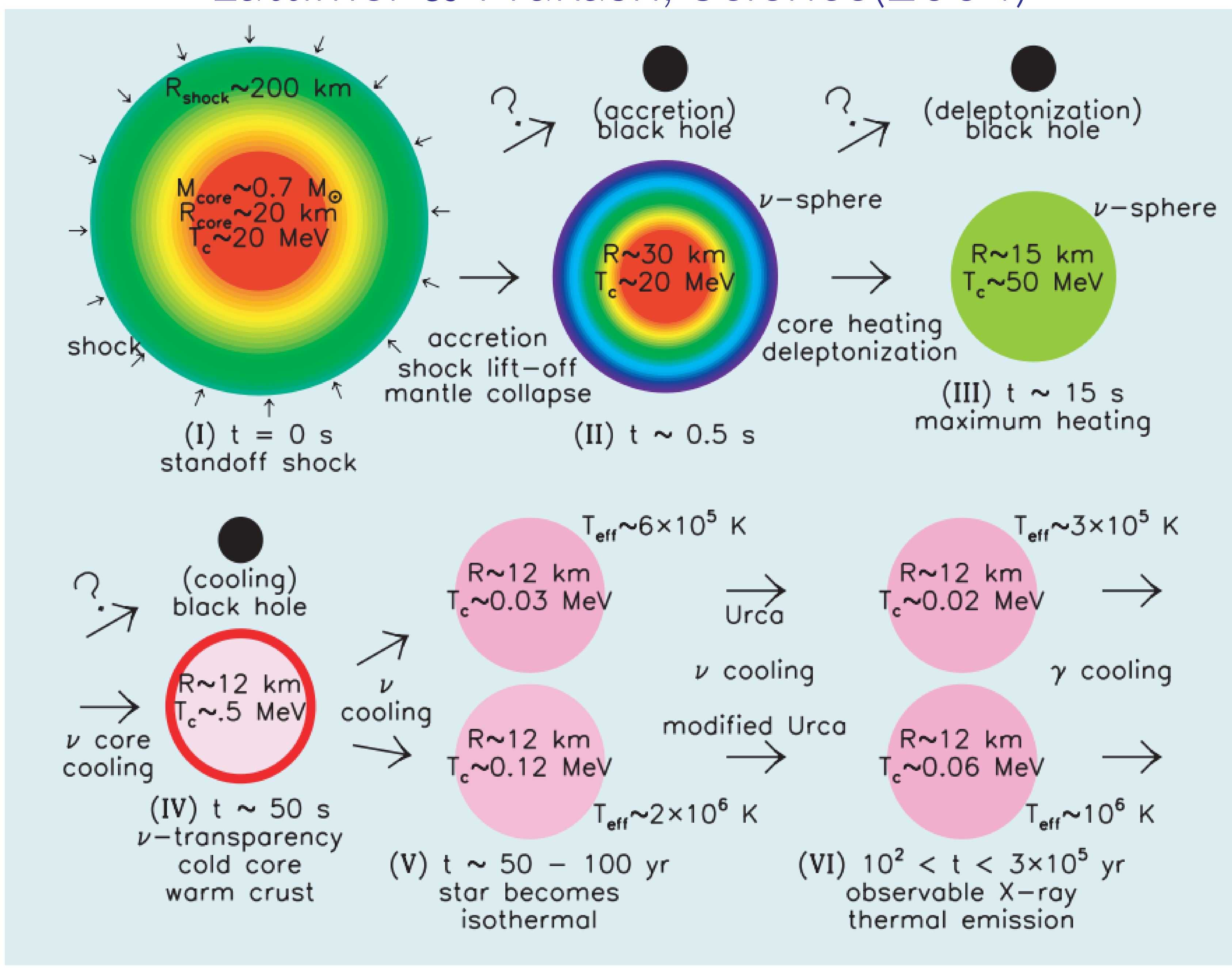
Pasta phases in cold–catalyzed neutron stars

Model dependence and uncertainties in the pasta phase properties.



The liquid crust of proto-neutron stars

Lattimer & Prakash, Science(2004)



⋆ NS are born hot with initial temperature exceeding 10^{10}K.
→ **Liquid multi-component plasma crust** composed of different nuclear species.

- **Liquid crust**, i.e., crustal ions are put into **collective motion.**
  → How does the center-of-mass motion influence the composition of the crust?
- **Coexistence** of different nuclear species.
  → How does the nuclear distribution evolve with n_B and T?

→ See my poster for answers !

Jacopo Tissino

Early detection
of neutron star binaries
with seismometers
on the **Moon**

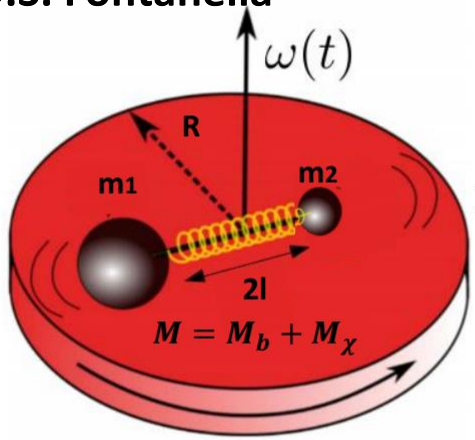
GS
SI

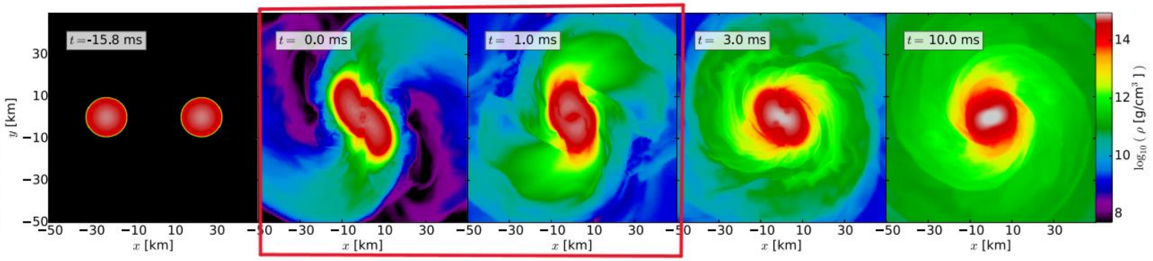
GRAN SASSO
SCIENCE INSTITUTE

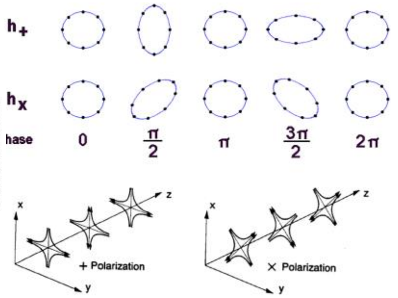
Binary Neutron Star mergers in a dark environment with an efective Lagrangian approach.

D.S. Fontanella

Thematic school GWsNS-2023: Gravitational Waves from Neutron Stars





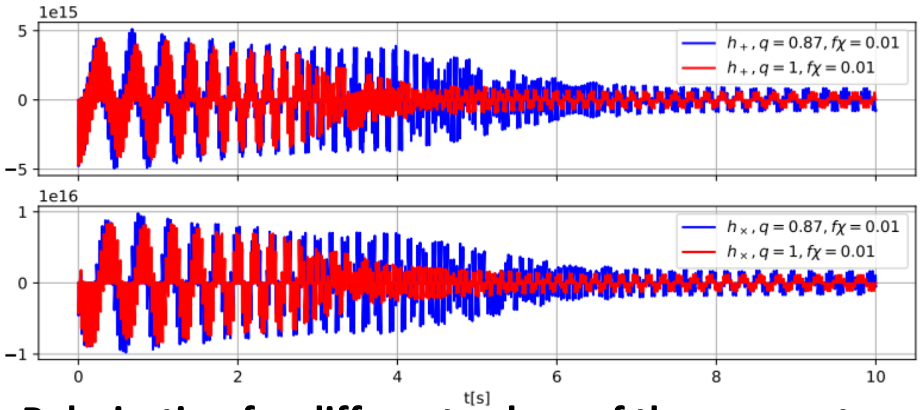


$$L = \frac{2(1-f_{ejec})q^2}{1+q}\frac{M_c^{5/2}}{2\mu^{3/2}}(\dot{r}^2 + (r\dot{\theta})^2) + \frac{f_{ejec}\frac{M_c^{5/2}}{\mu^{3/2}} + M_\chi}{2}R^2\dot{\theta}^2 - \frac{(1+q^2)}{2}k\left(\frac{l}{1+q} - r\right)^2$$

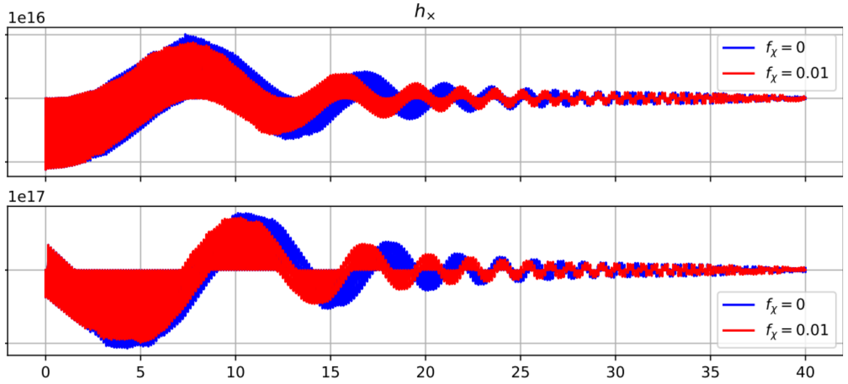
$$F_d = -\left(\alpha\frac{M_b}{R} + \beta\frac{M_\chi}{R}\right)\dot{r}^2.$$

$$dh_+ = (1-f_{ejec})\frac{M_c^{5/2}}{\mu^{3/2}}q(2\dot{r}^2cos(2\theta) + 2r\ddot{r}cos(2\theta) - 4r\dot{r}\dot{\theta}sin(2\theta)$$
$$- 4r\dot{r}\dot{\theta}sin(2\theta) - 2r^2\ddot{\theta}sin(2\theta) - 4r^2\dot{\theta}2cos(2\theta))$$

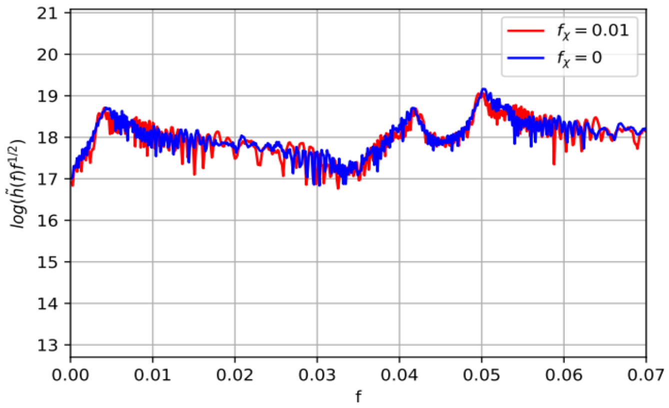
$$dh_\times = 4(1-f_{ejec})\frac{M_c^{5/2}}{\mu^{3/2}}q((\dot{r}^2 + r\ddot{r} - 2r^2\dot{\theta}^2)sin(2\theta) + (4r\dot{r}\dot{\theta}$$
$$+ r^2\ddot{\theta})cos(2\theta))$$



Polarization for different values of the mass rate assuming a small amount of DM f = 0:01 in the disk



Phase shift of the polarizations due to a DM = M/100 DM in the disk.

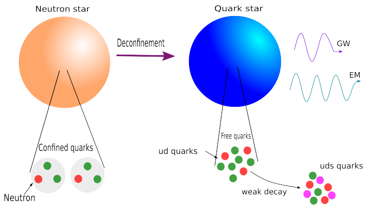


Comparison between PSDs for the interval t2 [0; 100]

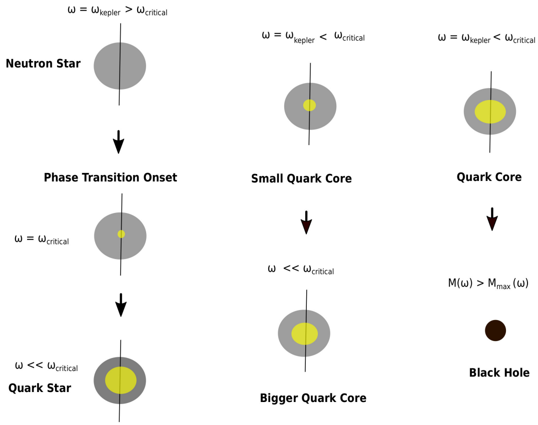
Spin-Down Driven Neutron Star to Quark Star Conversion

- Prasad R (PhD: IISER Bhopal, Postdoc: ICTS, Bangalore)

White dwarfs, Neutron Stars, Black holes exist...
Do quark stars exist ? and how they get formed ?



Formation Channel :
Neutron Star $\longrightarrow$ Quark Star
via spin-down



Observational Signatures: GWs, Braking index, Others...

Core-collapse supernova

A poster by

Noshad Khosravi Largani

Uniwersytet Wrocławski