On the detectability of nucleonic to quark matter transition from future gravitational wave detection using a null hypothesis

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Caen-Meudon Virgo Group

Neutron Rich Matter on Heaven and Earth, INT 22-2a
July 13, 2022

Nuclenic to quark matter

Equations of state with Phase transition

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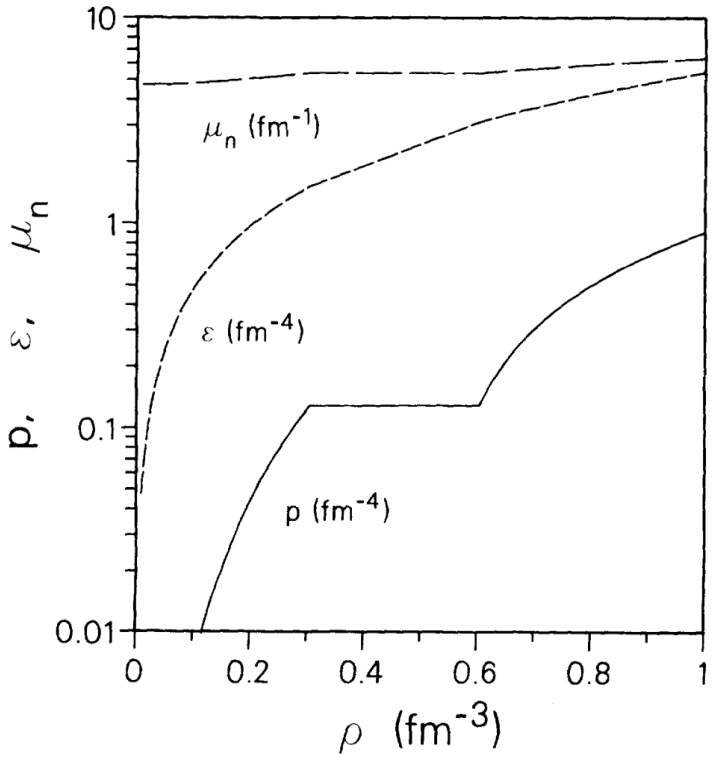
Equations of state with Phase transition



Glendenning PRD 46, 1274 (1992)

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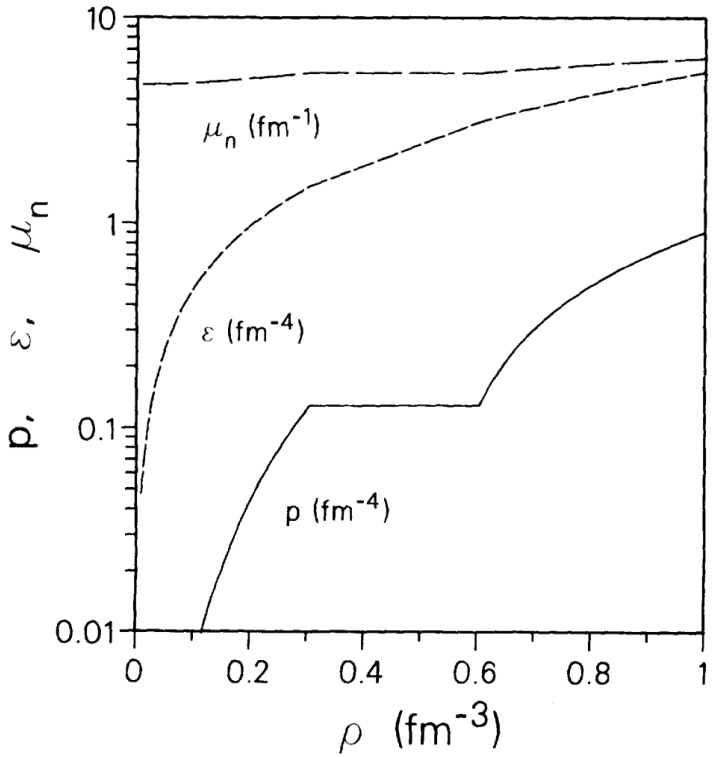

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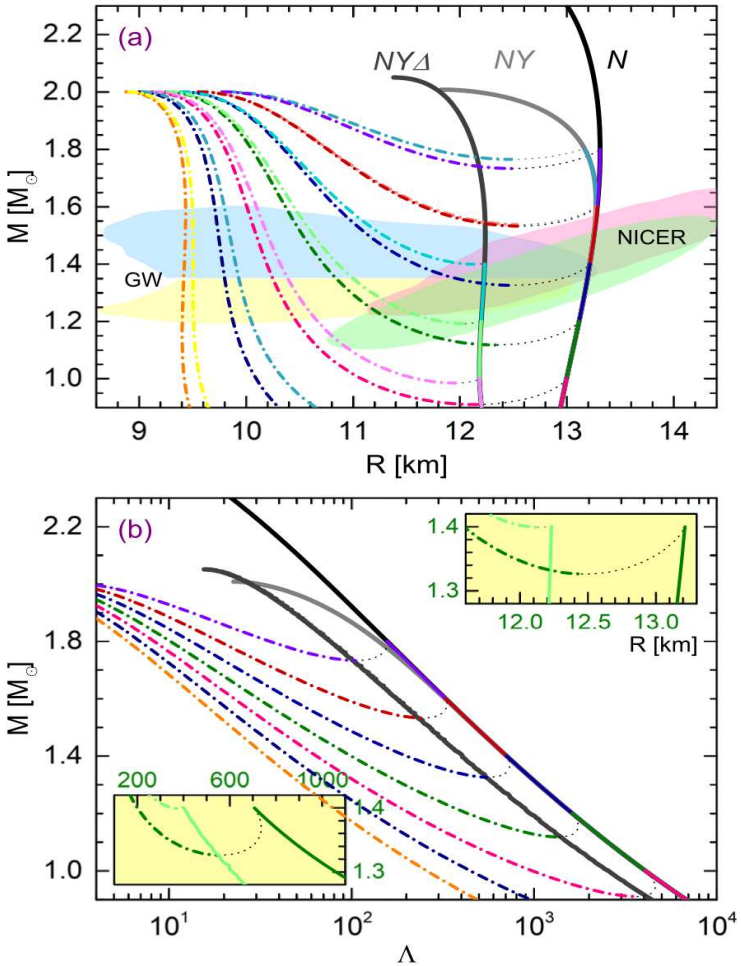

Li, Sedrakian and Alford, PRD 101, 063022 (2020)

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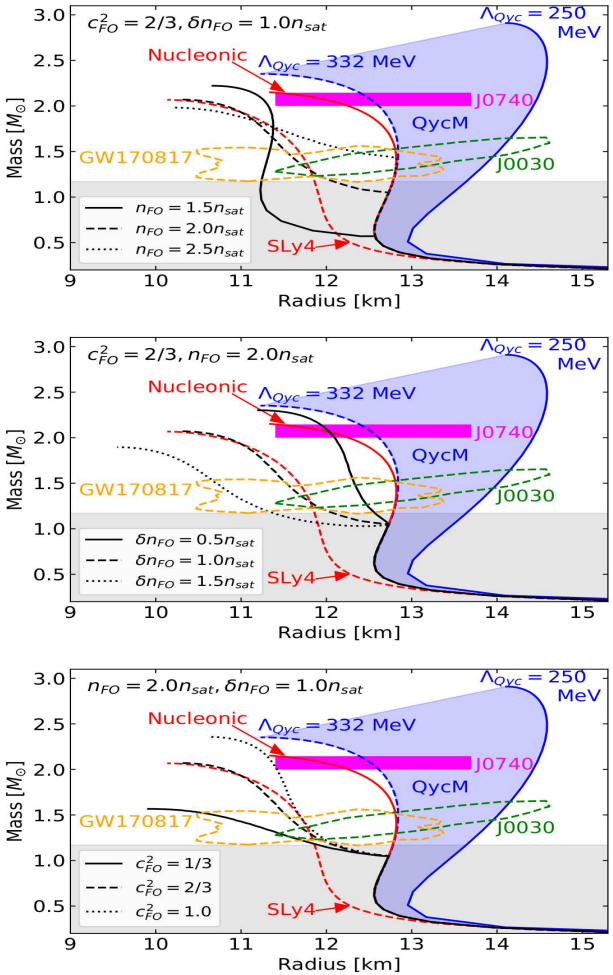
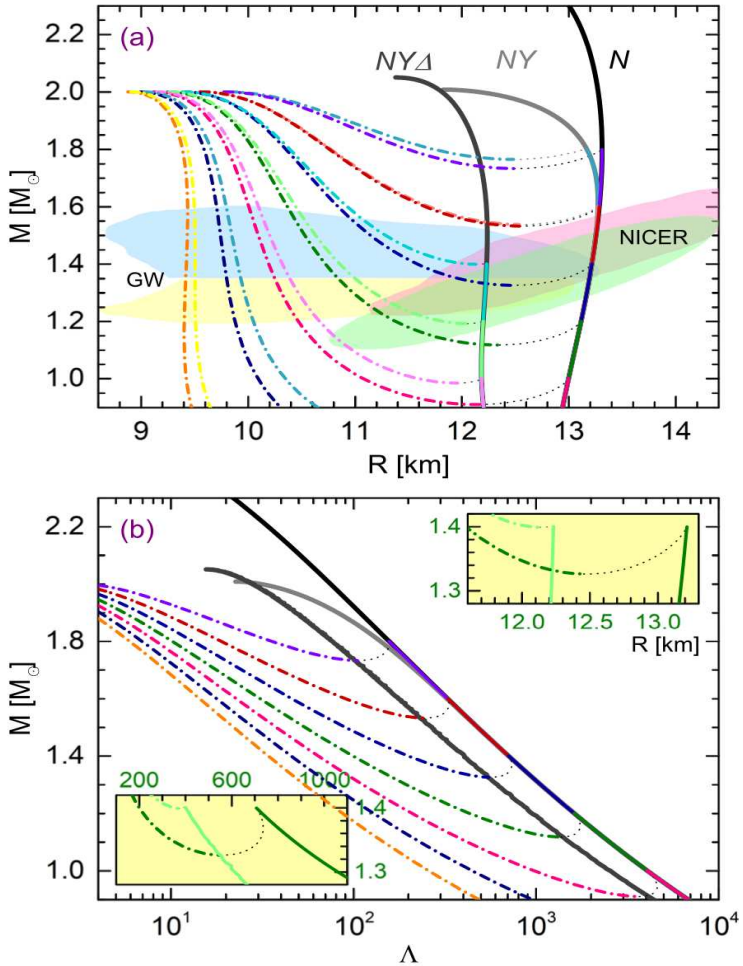


Somasundaram and Margueron, 2104.13612 (2021)



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The Null hypothesis

Nucleonic metamodel

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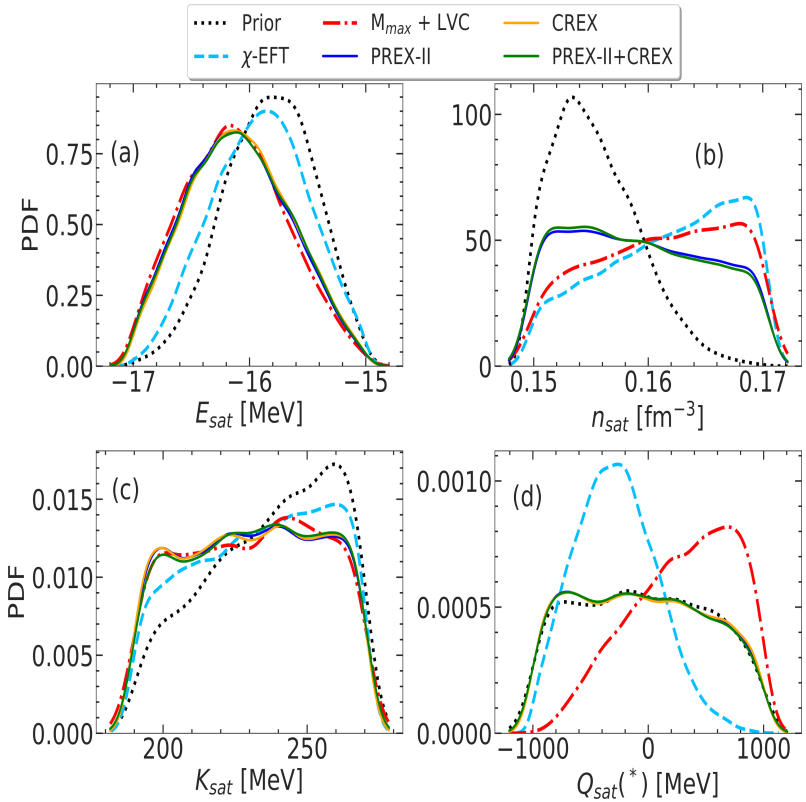

Nuclear Matter Properties

The Null hypothesis

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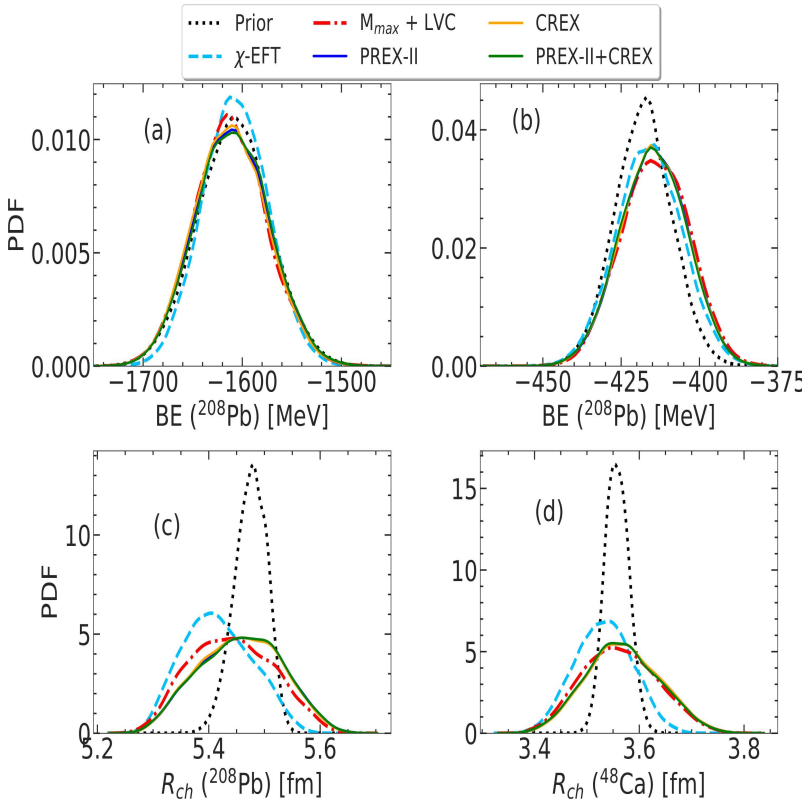

Finite Nuclei

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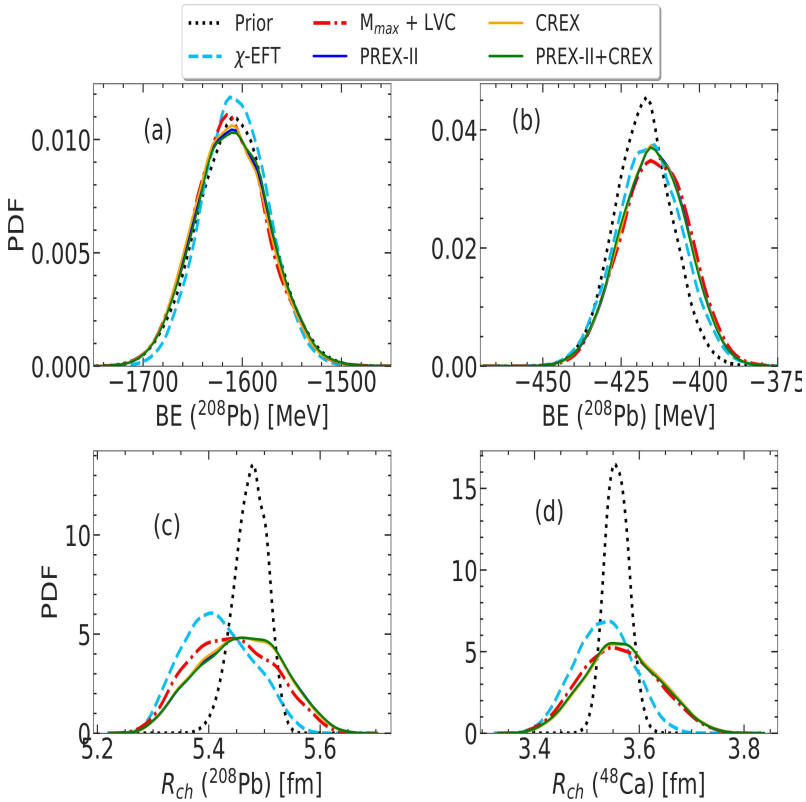

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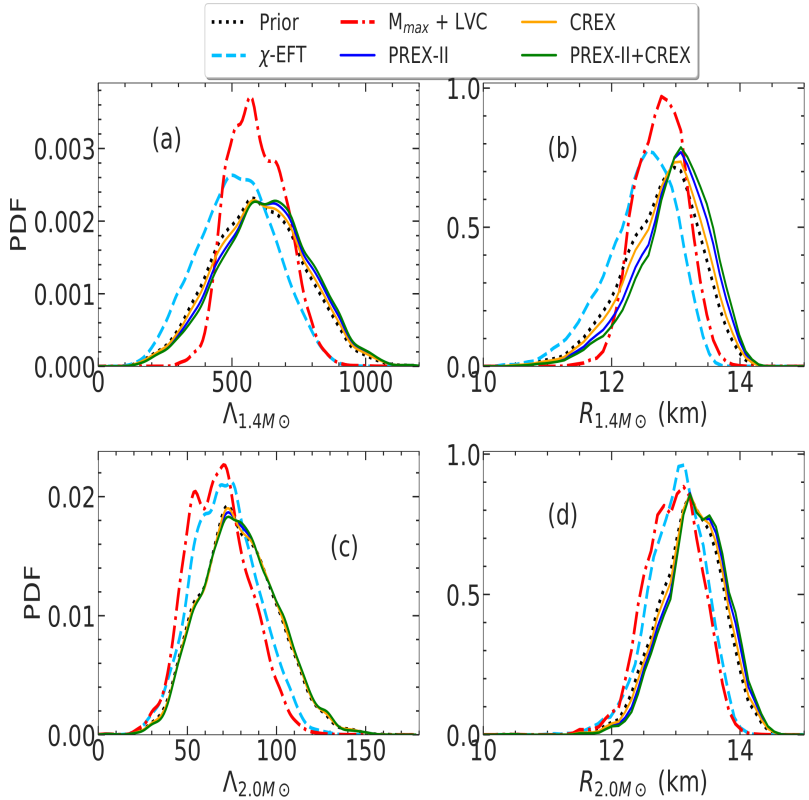

Properties of Neutron Star

The Null hypothesis

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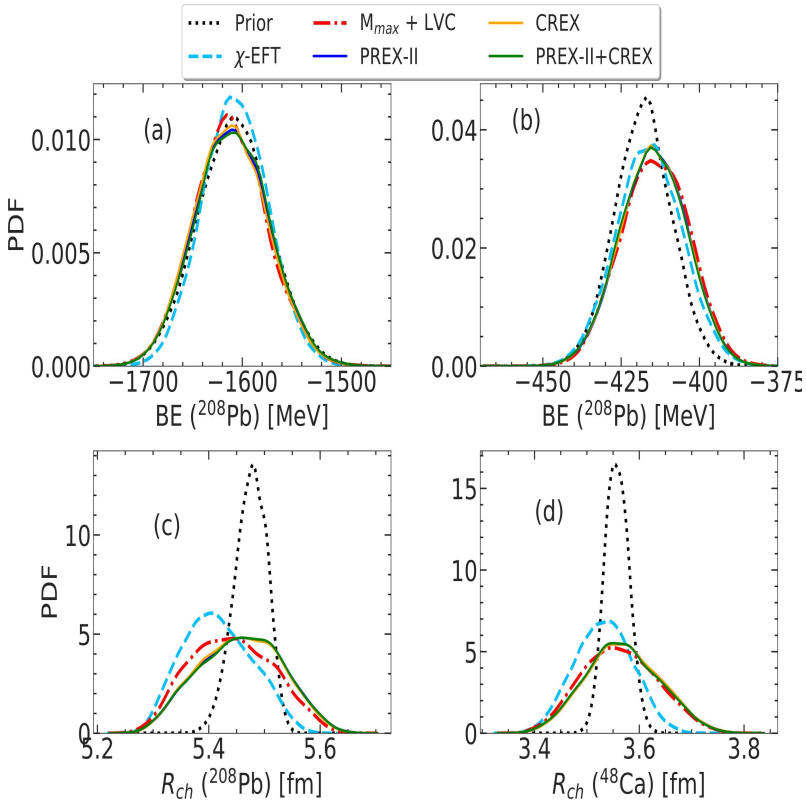

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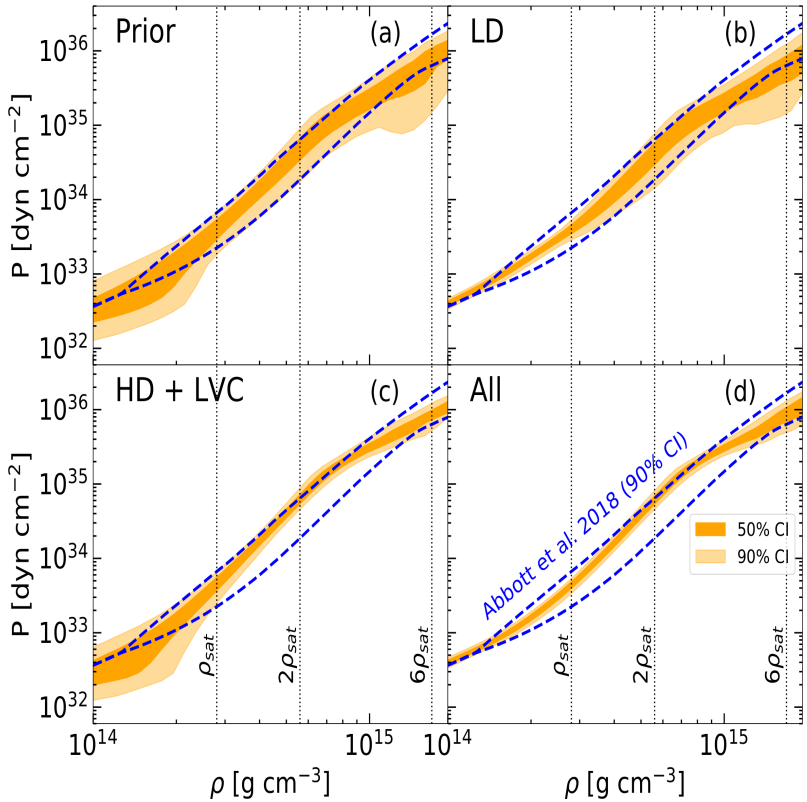

EoS

H. Dinh Thi 2021.

Looking for phase transition signal

Post-o5 LIGO-Virgo

$$\tilde{\Lambda} = \frac{16}{13}\frac{(12\mathrm{q}+1)\Lambda_1 + (12+\mathrm{q})\mathrm{q}^4\Lambda_2}{(1+\mathrm{q})^5}.$$

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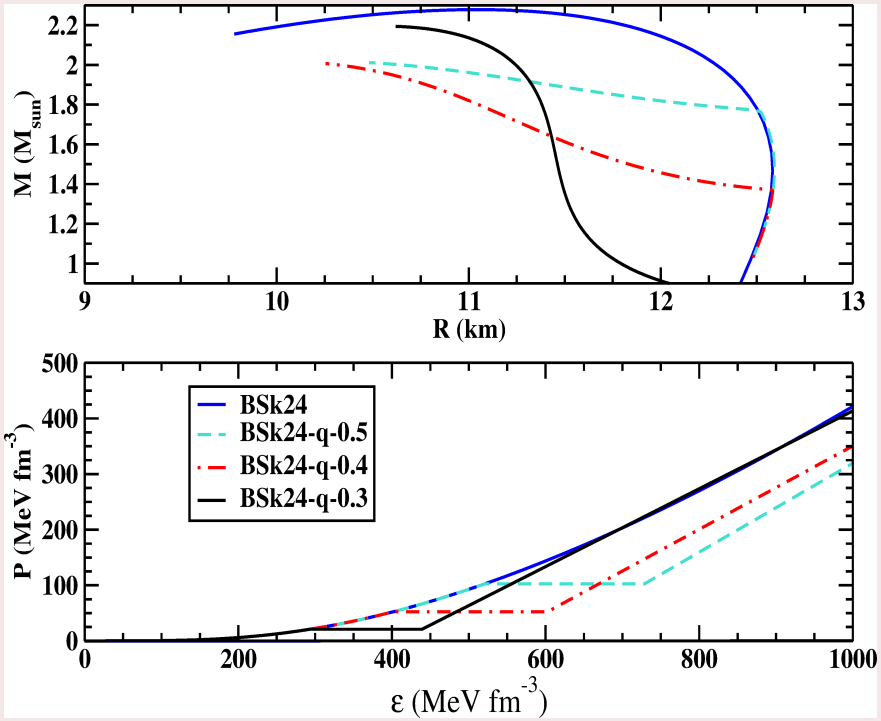
M-R & EoS



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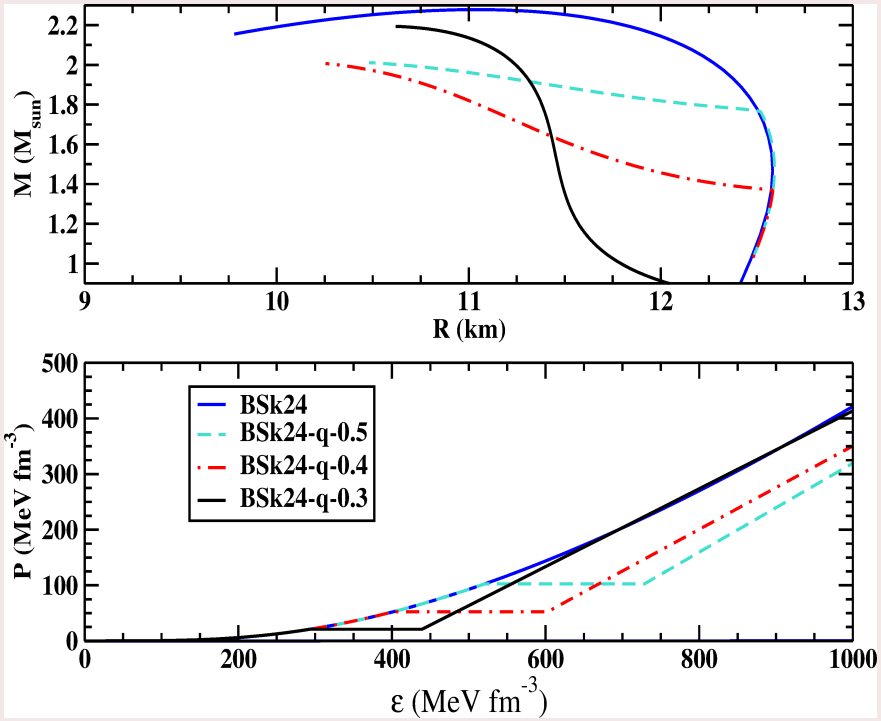
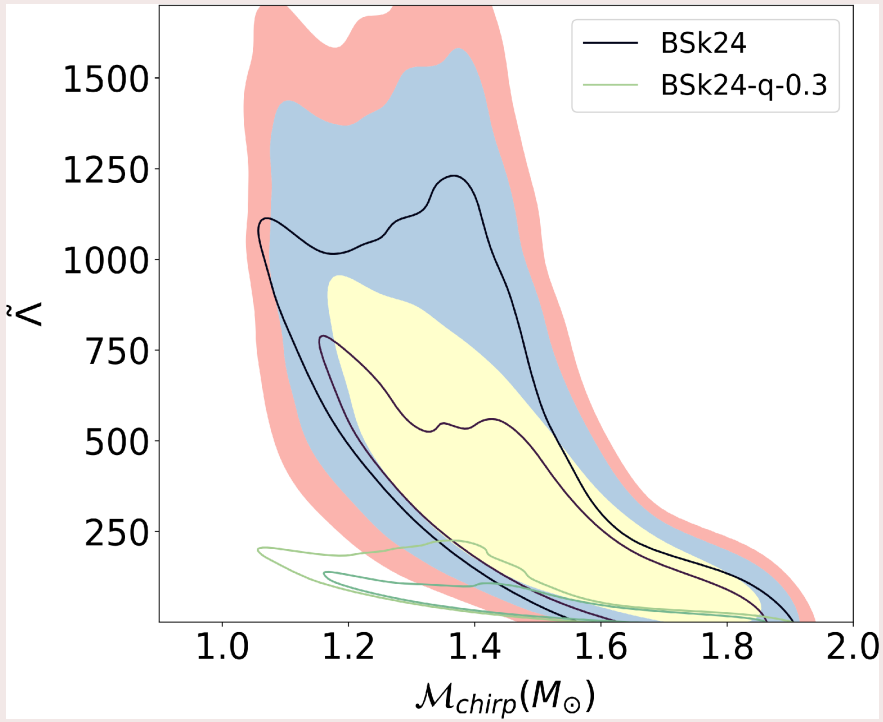


Distribution of tidal signal from GW



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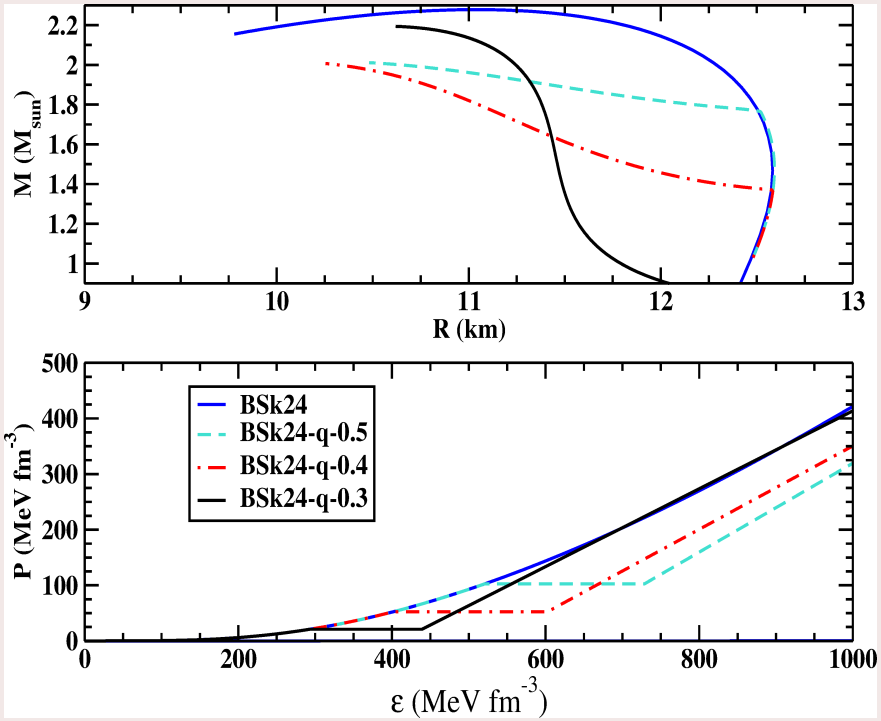

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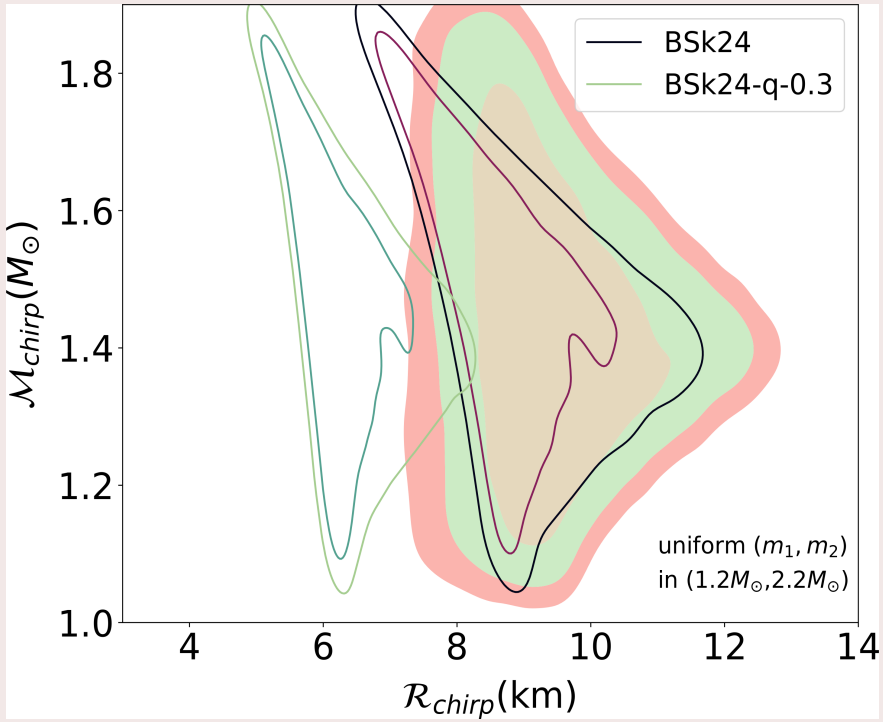

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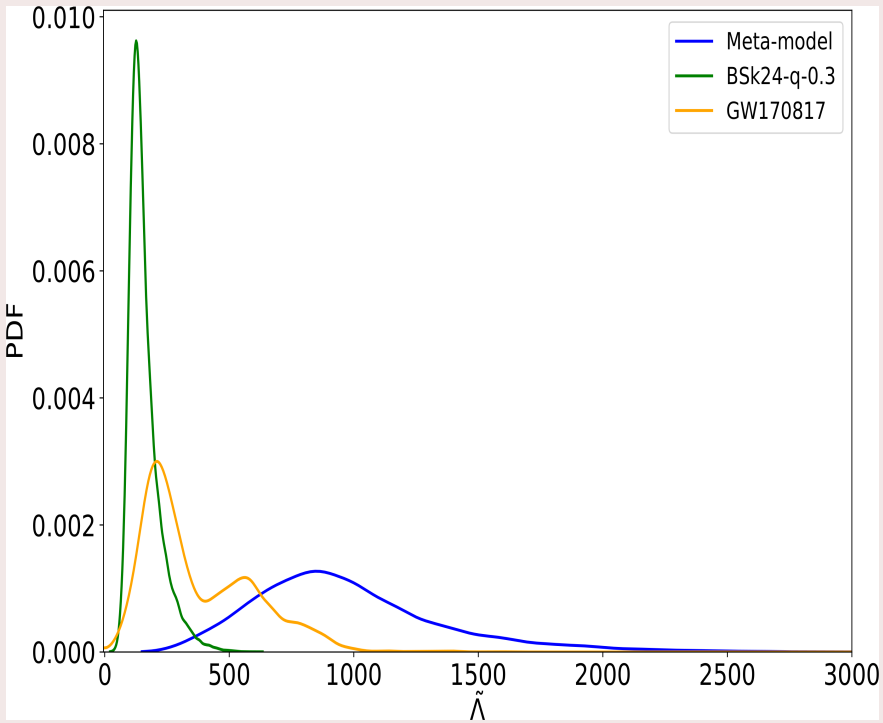

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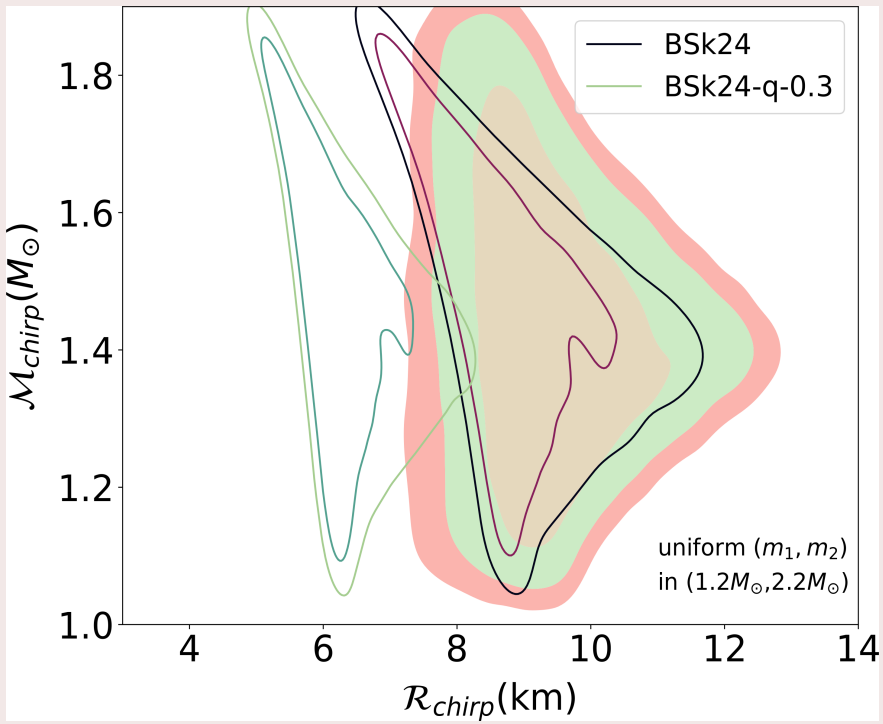

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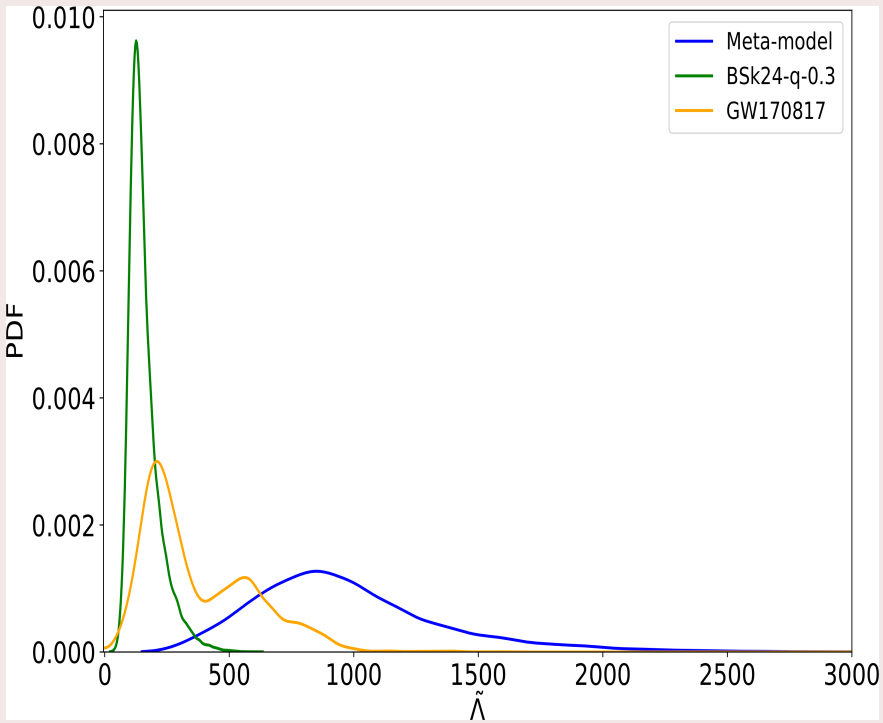

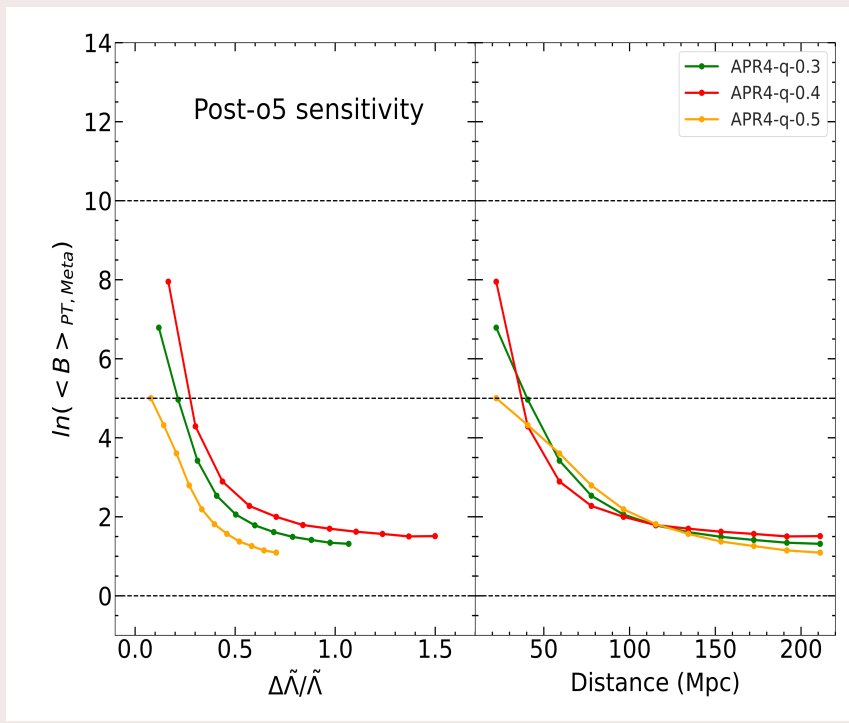

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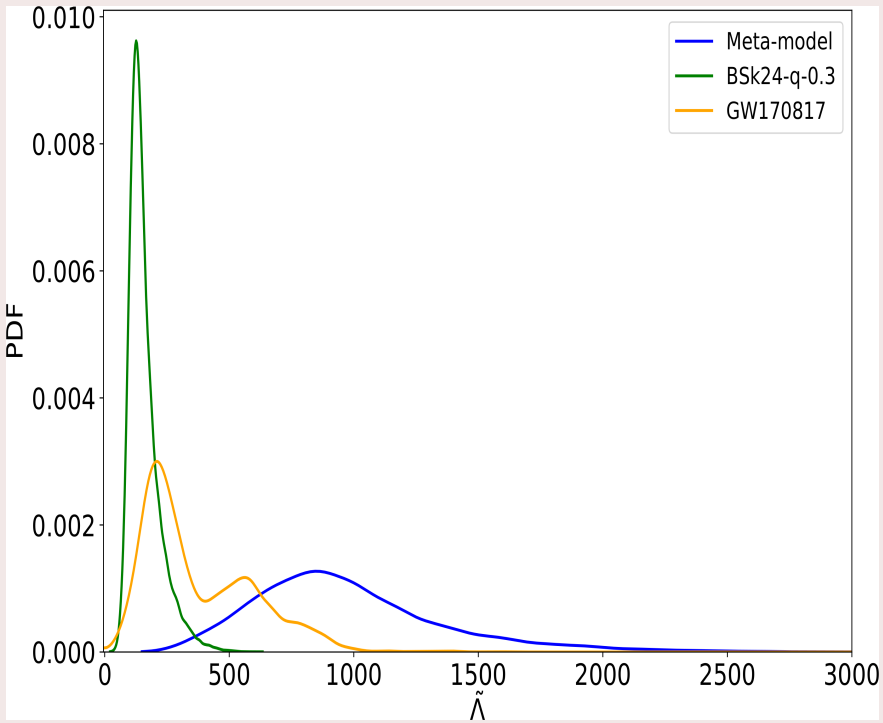

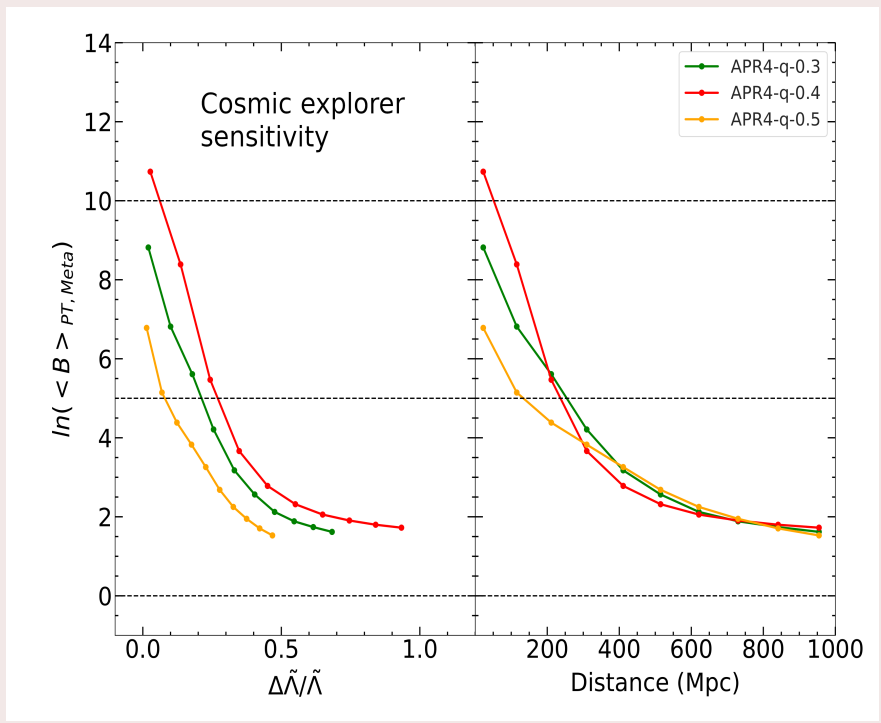

Collaborators

Caen-Meudon Virgo group

- Hoa Dinh-Thi
- Gaël Servignat
- Lami Suleiman
- Marco Antonelli
- Anthea Fantina
- Philip Davis
- Francesca Gulminelli
- Micaela Oertel
- Jérôme Novak