

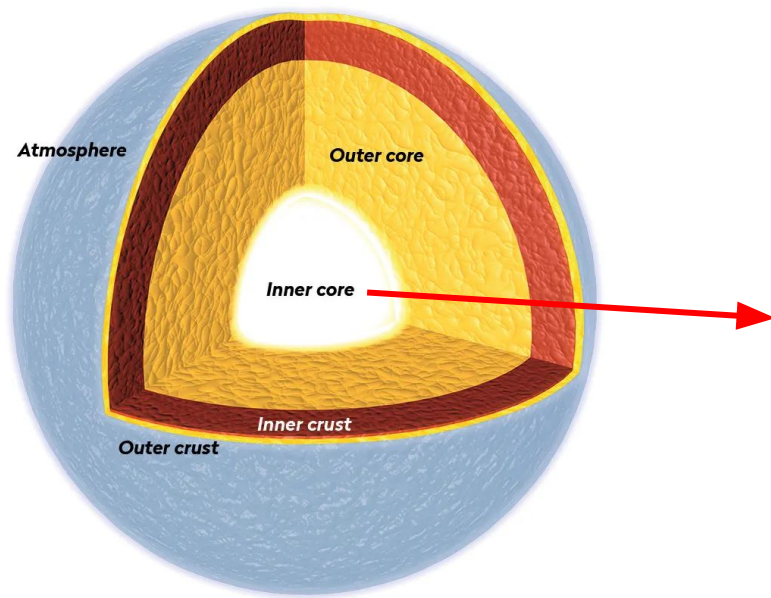
Quiescent low-mass X-ray binaries

M-R measurements for EOS inference

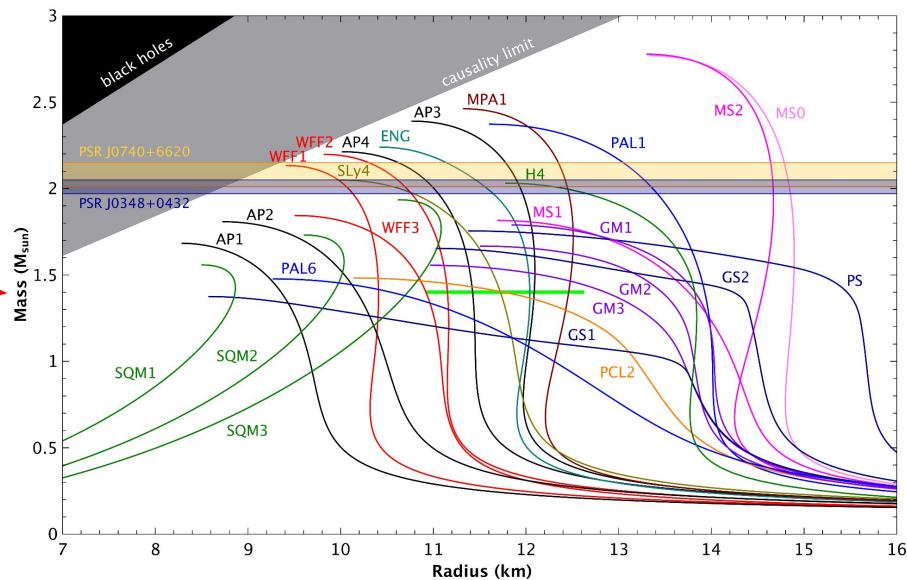
Christine Kazantsev

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The dense matter Equation of State (EOS)



Credit: Paul Wootton

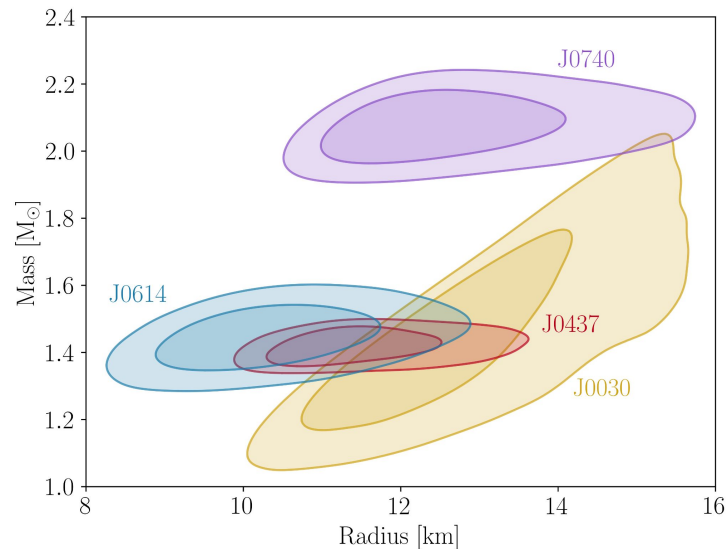
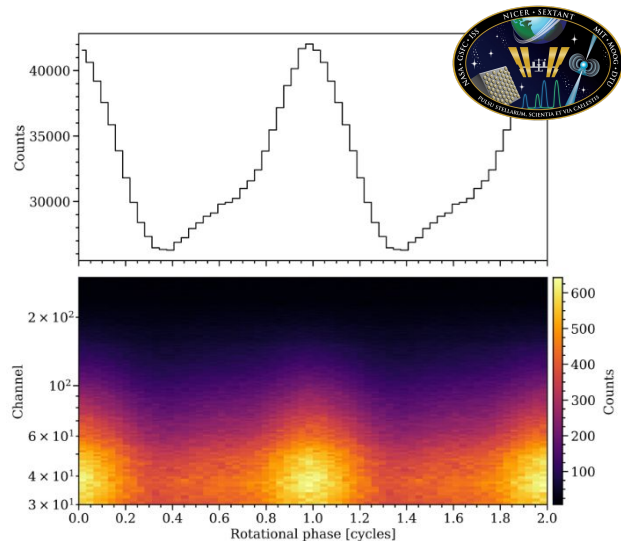


Credit: Norbert Wex

MSPs MR measurements with NICER

5 MSPs with published radii :

- **PSR J0030+0451** (Kini et al. 2026)
- **PSR J0437-4715** (Choudhury et al. 2024, Miller et al. 2025)
- **PSR J0740+6620** (Salmi et al. 2024a)
- PSR J1231-1411 (Salmi et al. 2024b) not shown
- **PSR J0614-3329** (Mauviard et al. 2025)



Radius measurements in qLMXBs

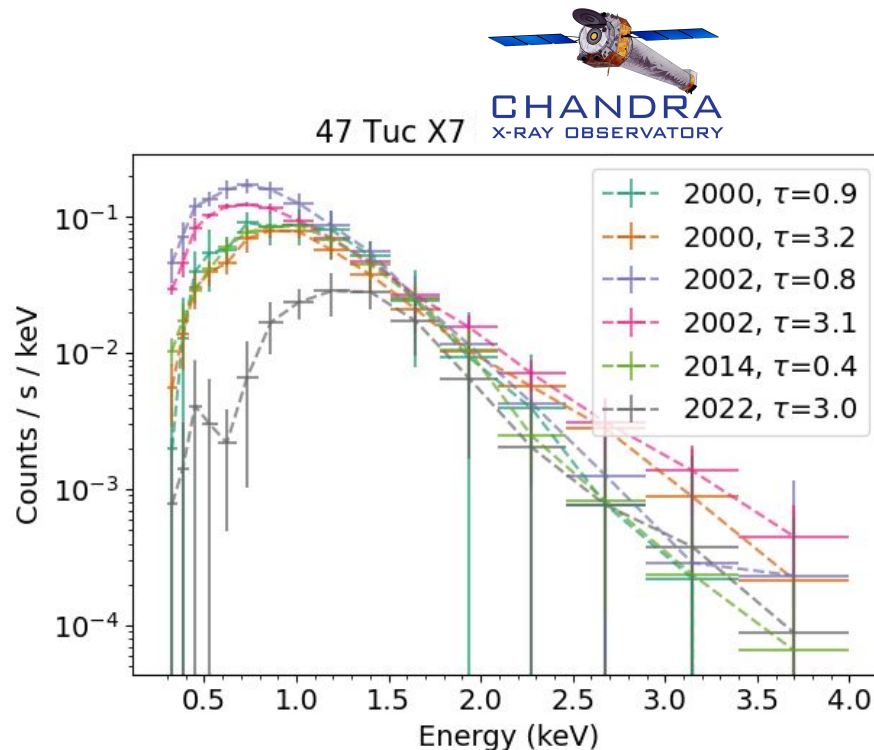
Quiescent LMXBs

- Pure BB-like spectrum
- no phase information, no detected pulsations

Sources of uncertainties:

- rotation neglected – **WRONG**
- uniform emission – **MAYBE NOT?**
- and more...

⇒ biases on M,R



Radius measurements in qLMXBs

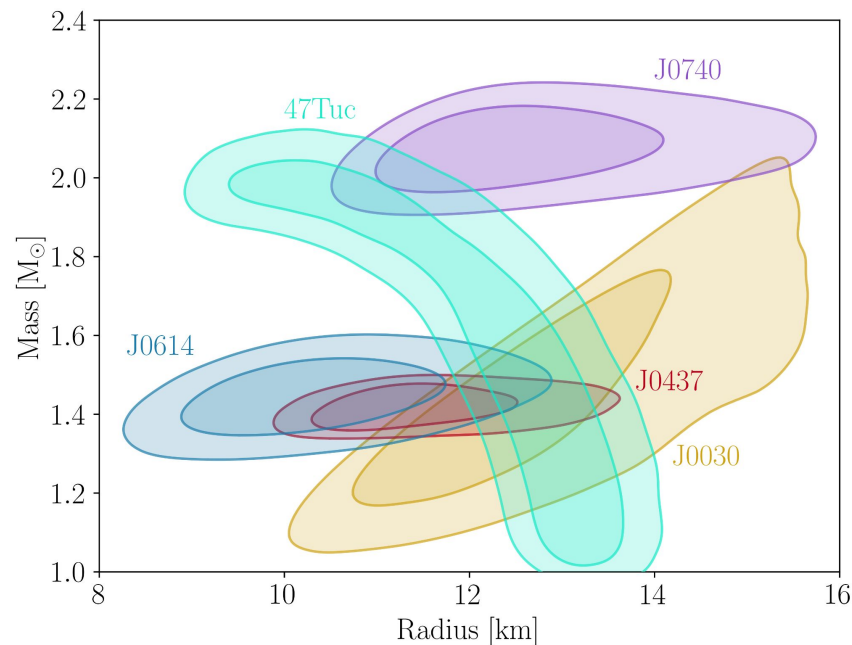
Quiescent LMXBs

- Pure BB-like spectrum
- no phase information, no detected pulsations

Sources of uncertainties:

- rotation ~~neglected~~ **added**
- **NON** uniform emission
- and more...

⇒ ~~biases~~ **reliable constraints** on M,R



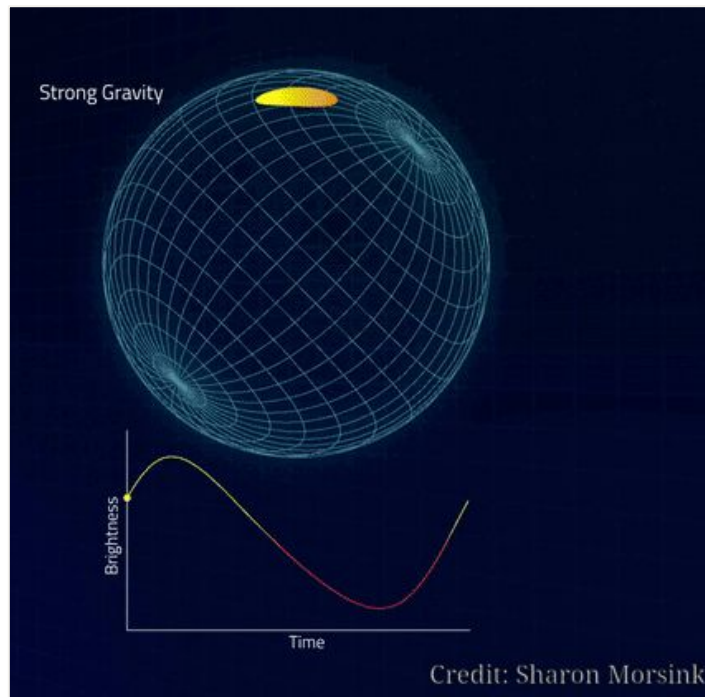
Thank you for your attention !

Contact: christine.kazantsev@utoulouse.fr

X-ray Pulse Simulation and Inference (X-PSI)

simulation of surface X-ray emission from rotating neutron stars

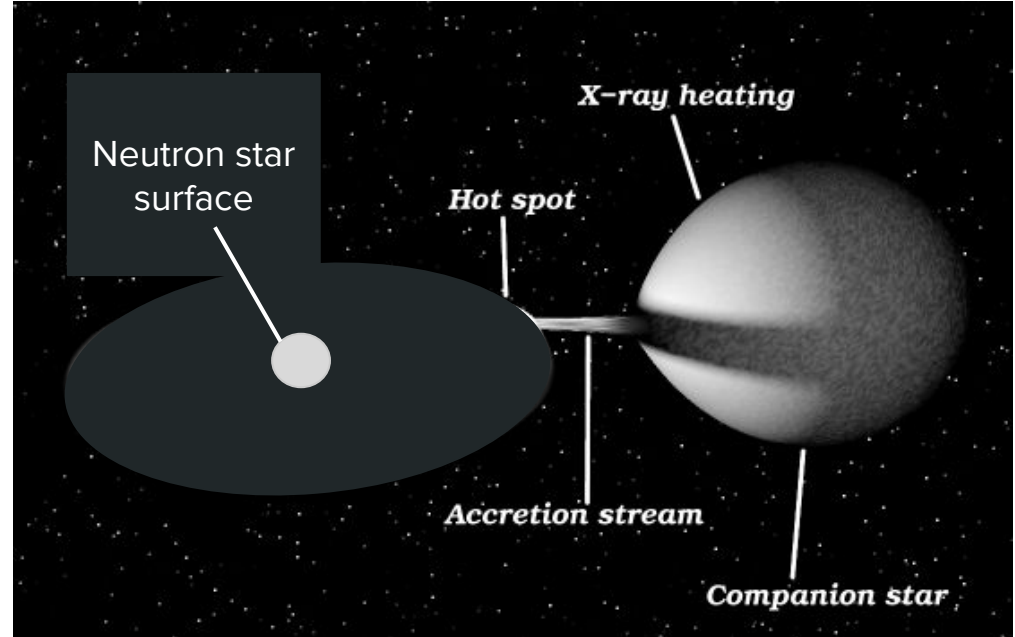
-  Bayesian inference to infer M, R ..
-  rotation effects: Doppler, oblateness
-  gravity: Schwarzschild spacetime
-  surface patterns : uniform, hot spot(s)...



<https://github.com/xpsi-group/xpsi>

Quiescent Low-Mass X-ray Binaries (qLMXBs)

- accretion outburst $\Rightarrow$ X-ray bright disk
- no accretion $\Rightarrow$ **quiescence**, thermal emission from the NS surface



Credit: R. Hynes

Application to 47Tuc - X7

