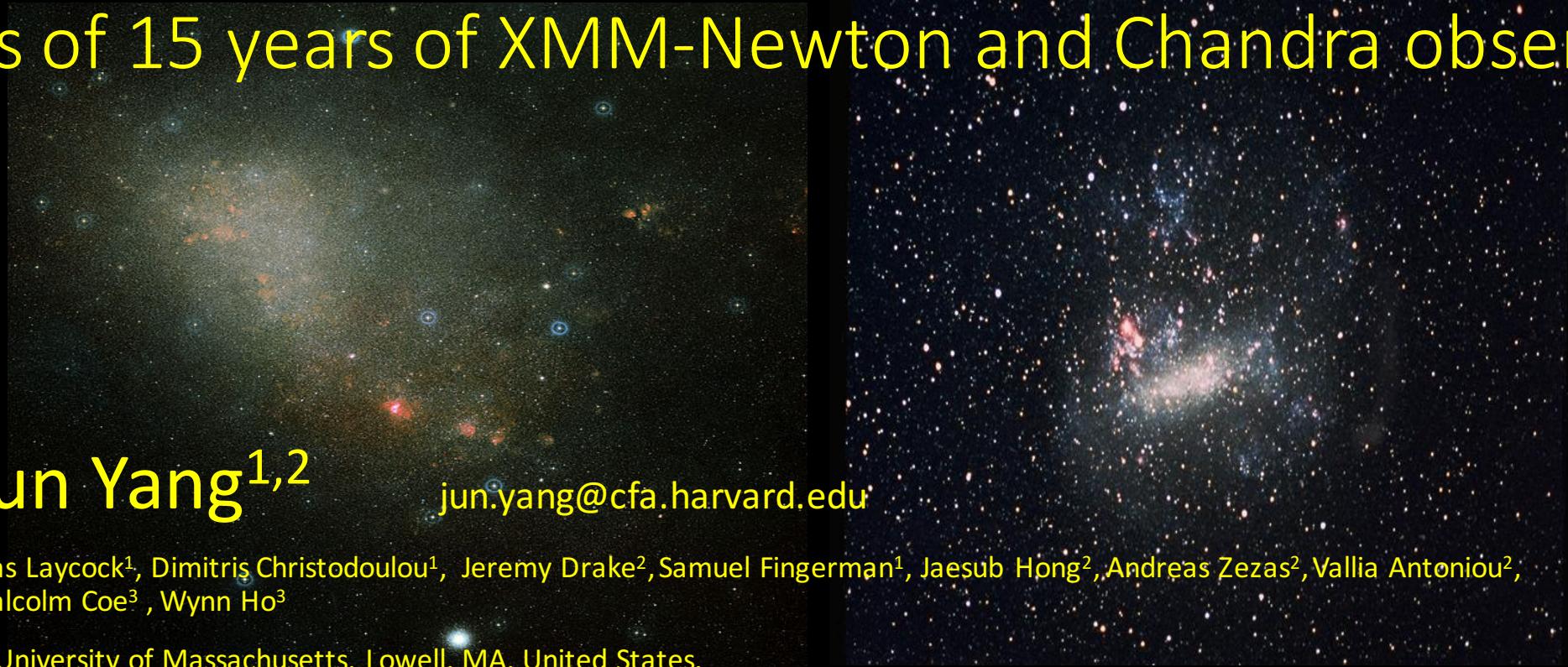


X-ray sources in the Magellanic Clouds: Analysis of 15 years of XMM-Newton and Chandra observations



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Outline

❖ Introduction to the **library** of pulsars in the **Magellanic Clouds**

event lists, light curves, periodograms & spectra

- Why study pulsars in Magellanic Clouds:
NSs hold unsolved problems
low absorption , known distance (->categorize luminosity of the Pulsars)

❖ Known pulsars with **combination of 3 satellites**

e.g. SXP 348, SXP 1323

❖ **Pulse profile** modeling

e.g. SXP 504

Library of pulsars in the Magellanic Clouds



Smithsonian
Institution

Pulsars
In SMC
&Model

Jun Yang

Intro
Library

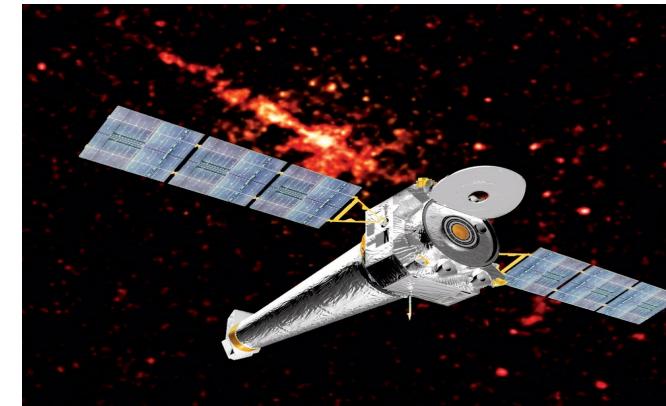
Pulsars
spin up
/down

Pulse
profile
model

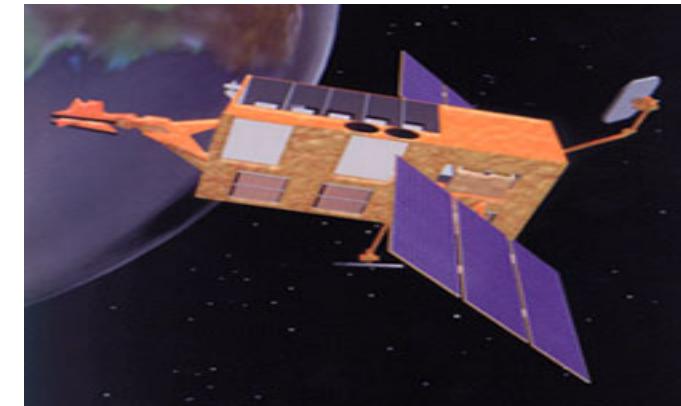
In sum



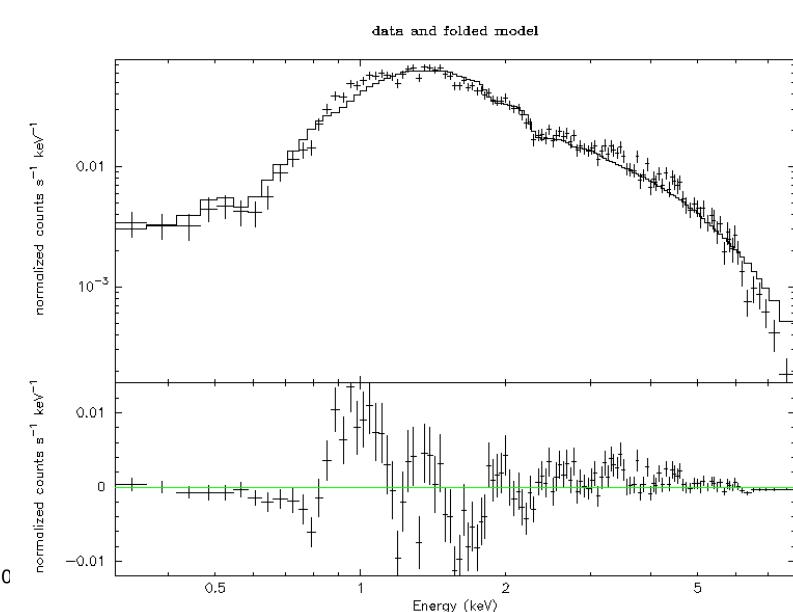
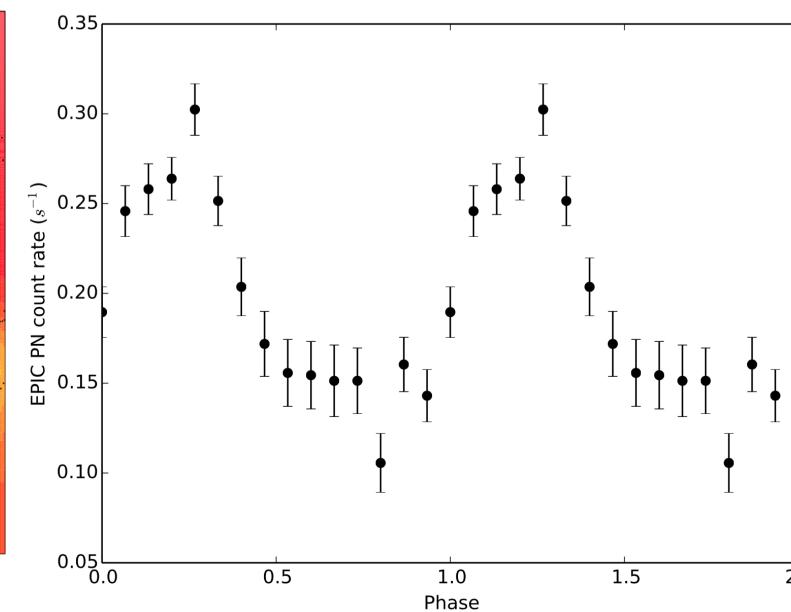
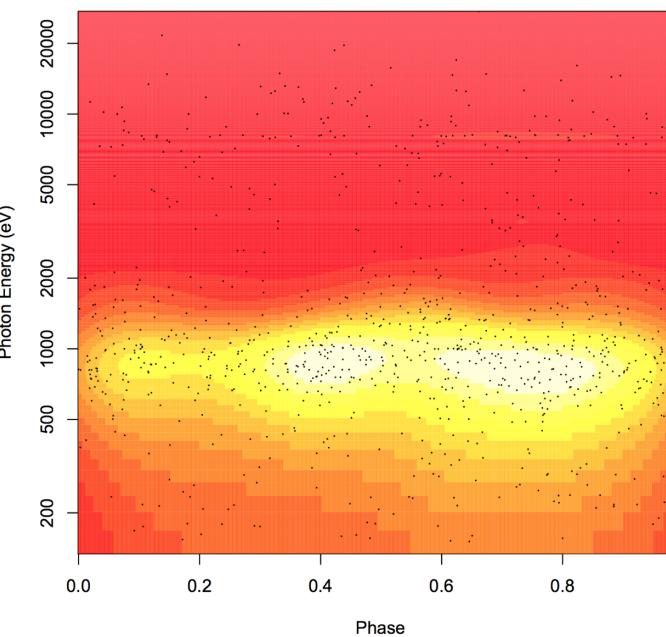
XMM-Newton
116+42 Obs: 2000-2014



Chandra
155+30 Obs: 2000-2014



RXTE
Weekly Obs: 1997-2012



Library of pulsars in the Magellanic Clouds



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Intro
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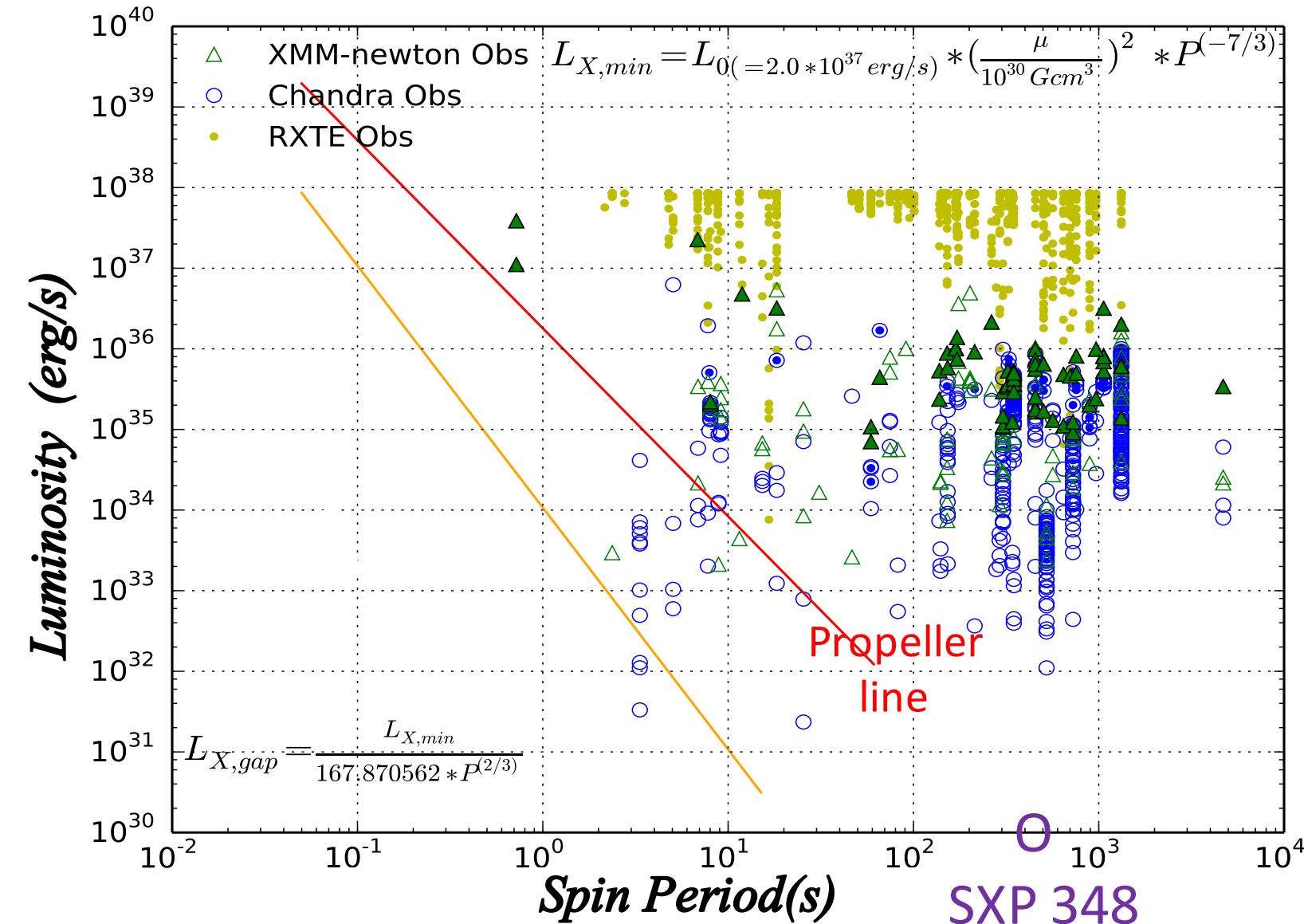
Pulse
profile
model

In sum

Observation overview

Propeller line
in Magellanic
high mass X-ray
binaries;

Did not find
the pulsations
below the
P-line



SMC Pulsar library with 3 satellite combination

e.g.
SXP 348

Luminosity
(erg/s)

RXTE does
not have
Pulse Frac
info

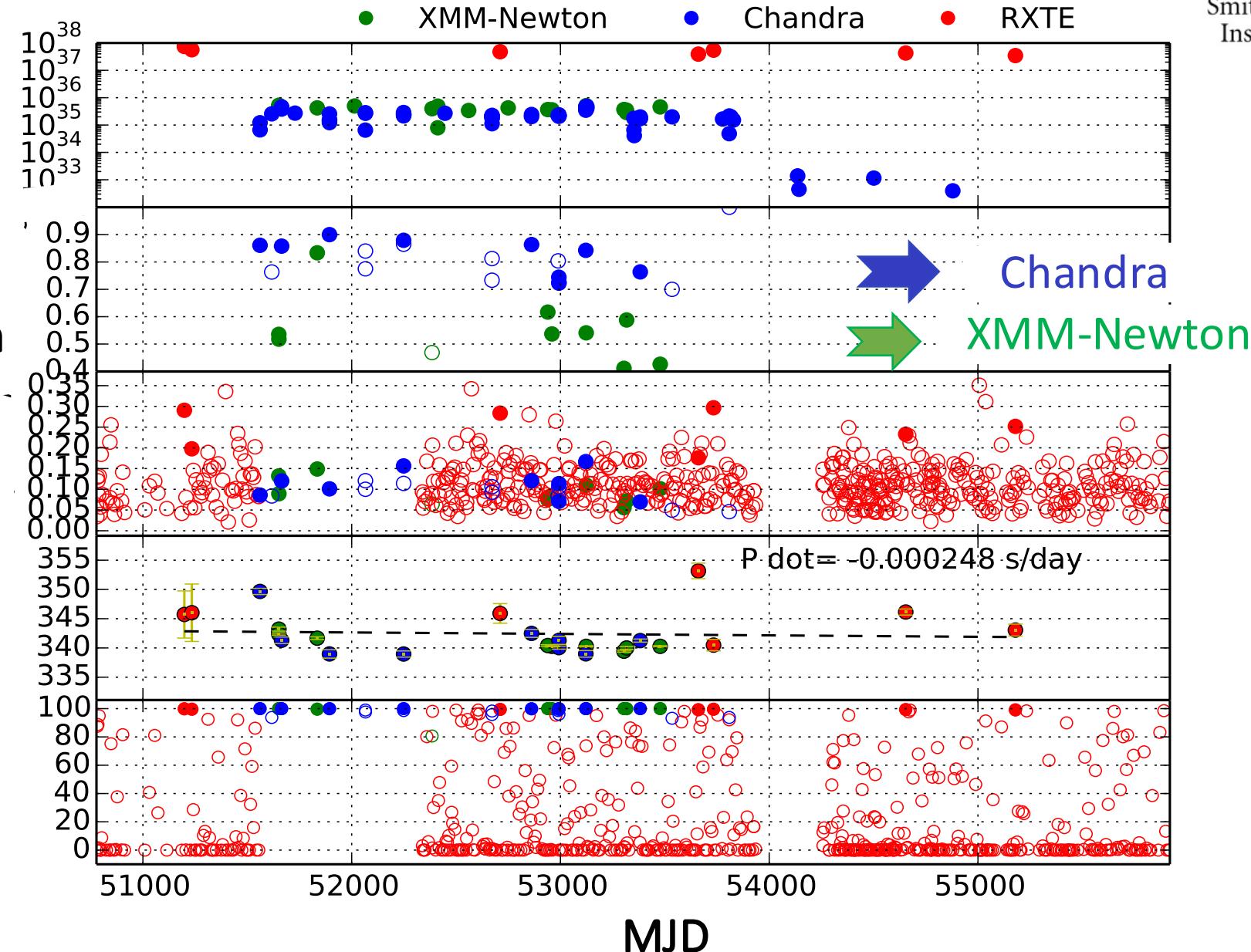
Pulse
fraction

Amplitude
(Counts/s)

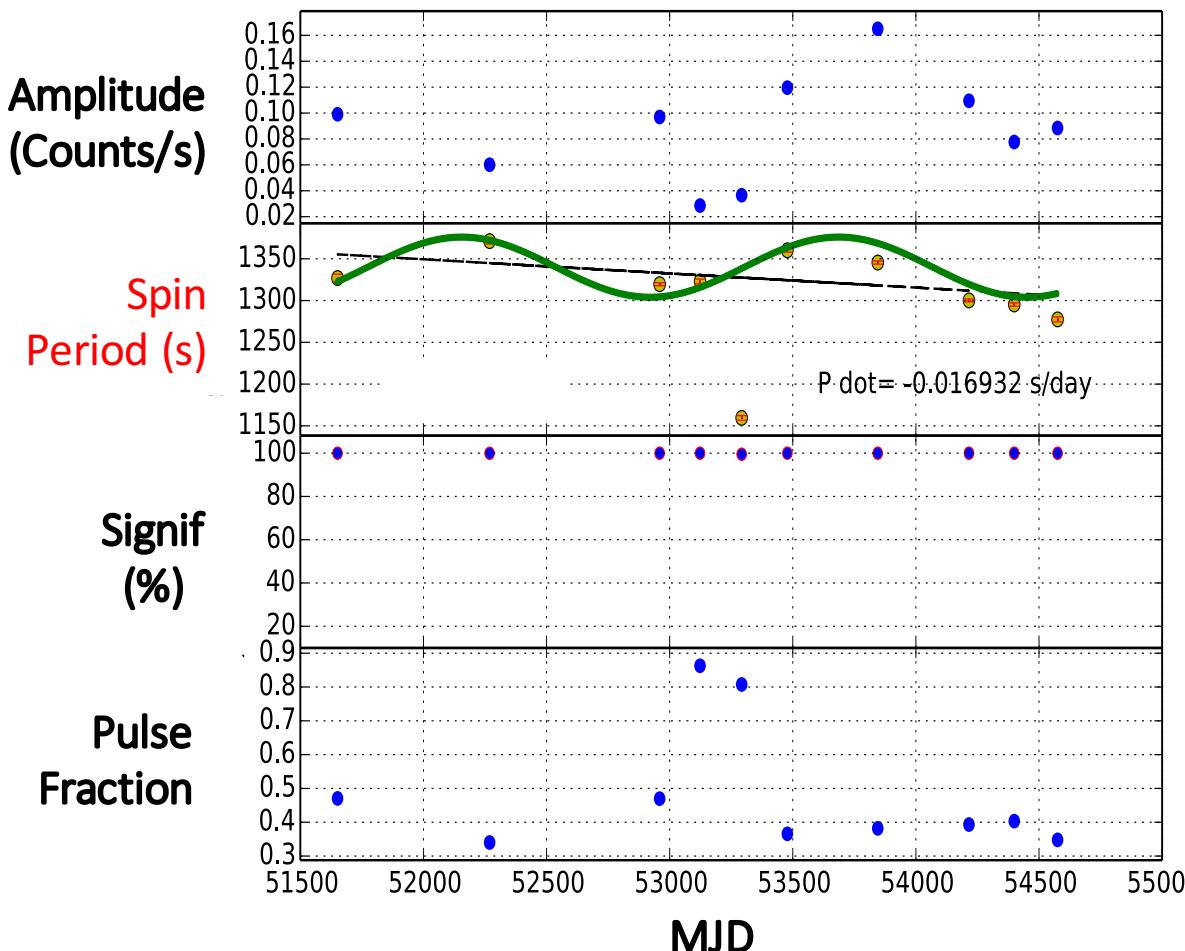
Spin up:
0.00102
s/day

Spin
Period(s)

Significance
(%)

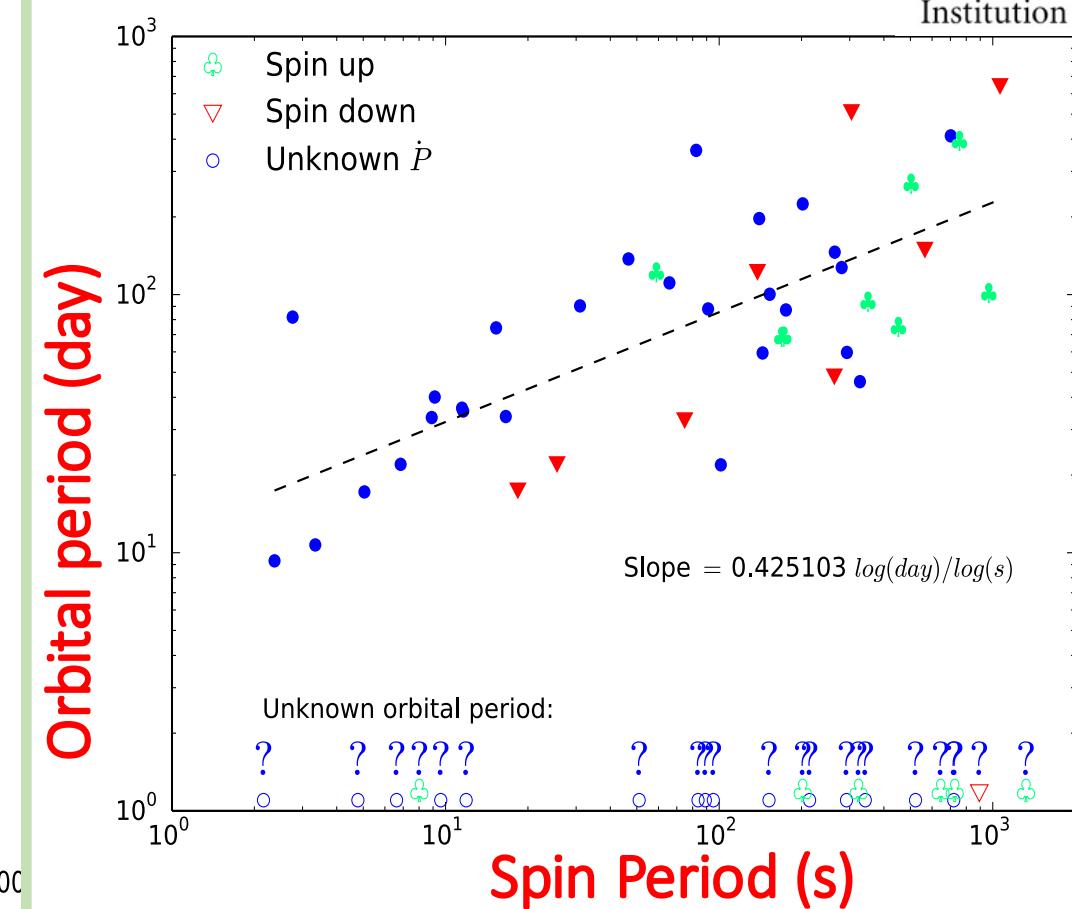


SMC Pulsar library products


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e.g. SXP 1323

Spin up: 0.016932 s/day



$$P_{\text{orbit}} = 12.0656 \text{ (days)} * P_{\text{spin}}^{0.4251}$$

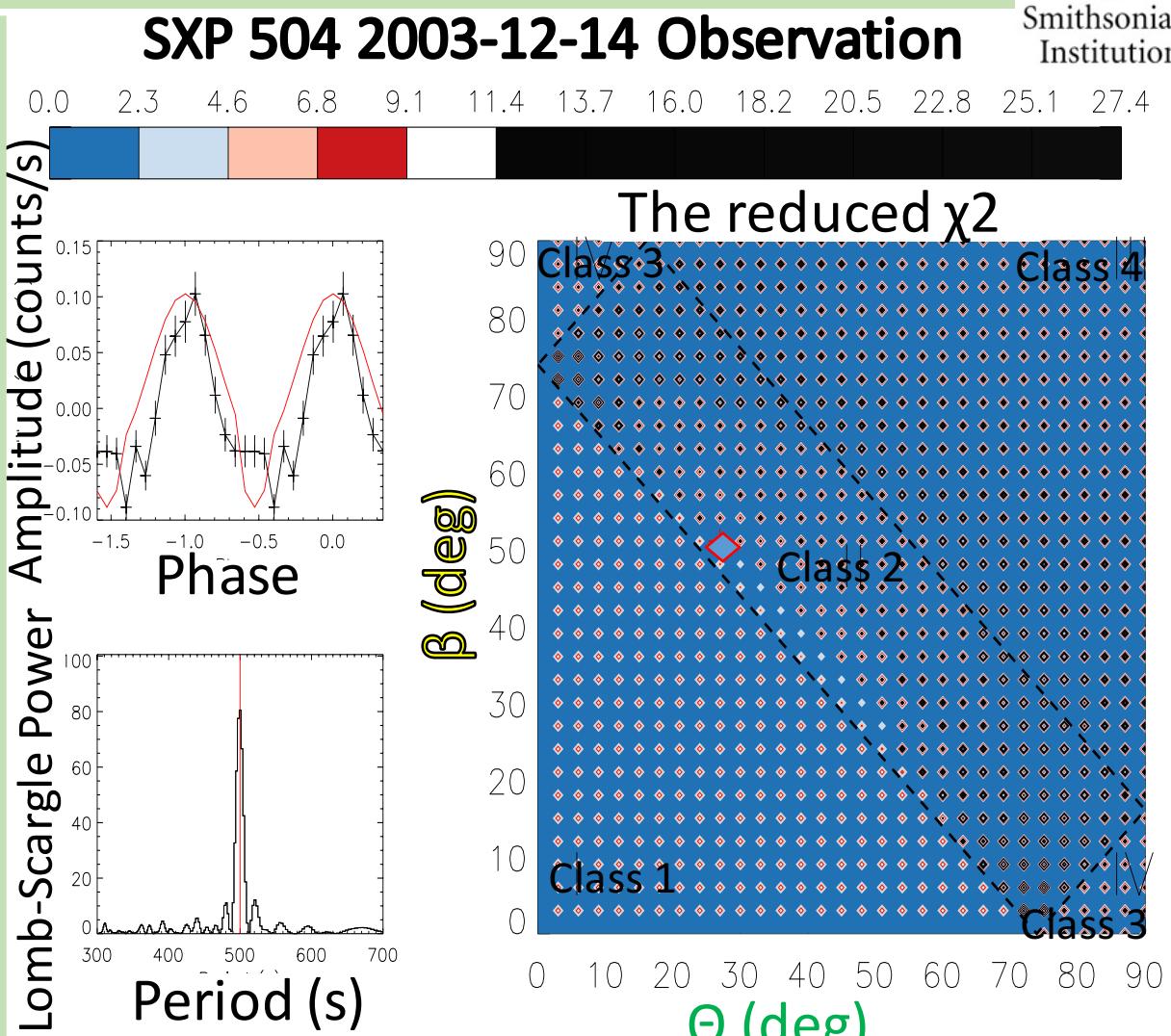
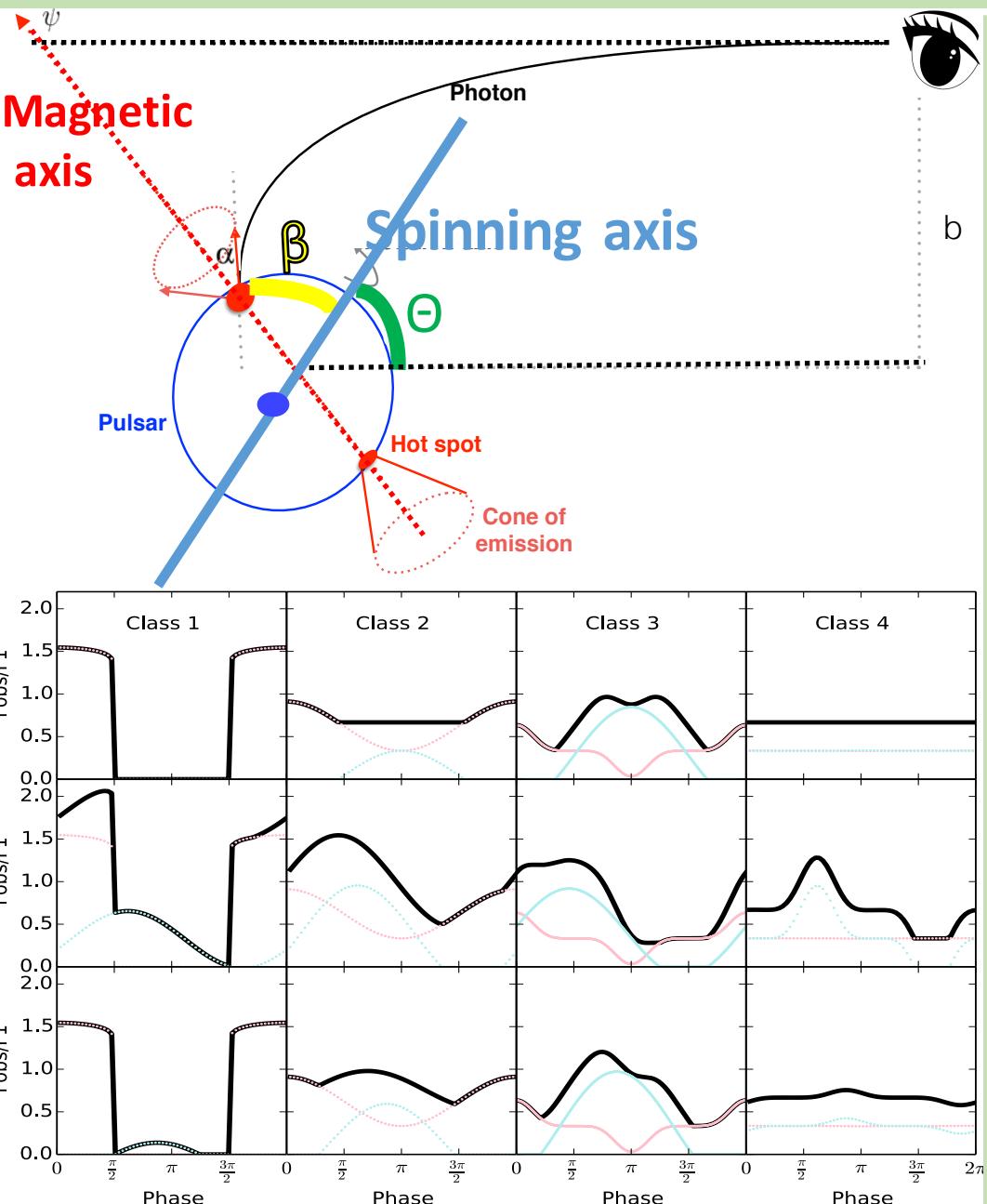
16 spin up

14 spin down

Model: Off-center magnetic axis with GR effect



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Best fitting angle: $\Theta = 28^\circ$ and $\beta = 52^\circ$

Θ : angle between spinning axis and B

β : angle between spinning axis and light of sight

Summary & Outlook

- ❖ Library of 3 satellites combination:
Known pulsars in **SMC & LMC** No pulsations found below Propeller line
- ❖ 16 spin **up** and 14 spin **down**
- ❖ Modeling
More phenomenon into current model. Eg., flow column geometry including physics of accretion shock, accretion rate and photo energy
- ❖ Astrosat
Investigate the hard X-ray sources; bright galactic pulsars, expand the period range of the pulsars

Pulsars
In SMC
&Model

Jun Yang

Into
Library

Pulsars
spin up
/down

Pulse
profile
model

In sum

Thank you !

American Astronomical Society International Travel Grant award

NASA grant NNX14-AF77G