



Contribution ID: 278

Type: **Poster**

## Using millisecond pulsars to calibrate XMM/Newton onboard clock

*Monday 7 December 2015 18:38 (3 minutes)*

The XMM-Newton space telescope is capable of 30-microsecond time resolution but its onboard clock drifts, for example due to changes in temperature. Current calibration documentation only provides an upper limit on the clock drift of  $10^{-8}$ , but observations of X-ray millisecond pulsars (MSPs) suggest that it should be more stable.

Using kilo-second XMM-Newton observations of MSPs taken with the EPIC pn-camera in fast timing mode in addition to radio timing measurements from the ATNF pulsar catalog for J1939+2134 (641.9 Hz), J0437-4715 (173.6 Hz), J0218+4232 (430.4 Hz) and J0534+2200 (29.9 Hz), we analyzed the pulse shape for each object with the aim to detect the broadening in the profile produced for a linear clock drift through the use of the statistical H-test plus minimization methods. Our results suggest that the clock is much more stable than what was previously claimed in the literature.

A well-established clock stability would permit to derive physical quantities with a properly understood accuracy and perform interesting measurements in accreting X-ray millisecond pulsars (e.g. spin-down rate), transients, among others.

**Author:** Ms CRUCES, Marilyn (Instituto de Astrofísica, Pontificia Universidad Católica de Chile)

**Co-authors:** Dr ARCHIBALD, Anne (ASTRON, Netherlands Institute for Radio Astronomy); Dr KONDRATIEV, Vlad (ASTRON, Netherlands Institute for Radio Astronomy)

**Presenter:** Ms CRUCES, Marilyn (Instituto de Astrofísica, Pontificia Universidad Católica de Chile)

**Session Classification:** 15 - Binaries