



Department of Physics & Astronomy Colloquium

Calibrating the clock of JWST to sub-second accuracy

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Abstract: JWST, despite not being designed for observing high time-resolution phenomena, can be an unparalleled tool for such studies, opening wide the sub-second infrared timescale regime, if timing systematics can be controlled. Rapid time-domain studies, such as lag measurements in accreting sources and Solar System occultations, require both precise inter-frame timing and knowing when a time series begins to an absolute accuracy significantly below 0.5s

I present here results from a JWST clock calibration program. JWST observed the deeply eclipsing double white dwarf system ZTF J153932.16+502738.8 over two ~9hr epochs with JWST's NIRCam. The well-known ephemeris of ZTF J1539 allows us to use it as a natural timing calibrator. By comparing the expected time of the eclipses with the actual eclipse times as measured by JWST, one is able to provide strong constraints on the accuracy of JWST's clock. The results from this program imply that JWST can be used for sub-second time-resolution studies down to the ~100ms level, significantly better than the pre-launch requirements of ~0.5s. I will also discuss applications of these results in the context of recent observations of black hole X-ray binaries with JWST, including a recent spectroscopic study of the X-ray binary GRS 1915+105 with JWST's Mid-Infrared Instrument (MIRI).

Thursday 27 March 2025, 1:30-2:45 PM Mountain Time
The talk will be held via Zoom. You can attend in person in
Science Commons SA 8003
or join via Zoom:
<https://uleth.zoom.us/j/98735210255>
Everyone welcome!

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