



# - RAY ASTRONOMY 2019

*Current Challenges and New Frontiers in the Next Decade*

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## **NICER+NuSTAR phase-resolved spectroscopy of quasi-periodic oscillations in the X-ray binary GRS 1915+105**

*Friday, 13 September 2019 14:18 (2 minutes)*

Low frequency quasi-periodic oscillations (QPO) with periods between  $\sim 10$  s and  $\sim 0.05$  s are often seen in the X-ray flux of accreting stellar-mass black holes. These are often attributed to the Lense-Thirring precession of the inner accretion flow, a General Relativistic effect caused by the spin of the black hole.

QPO phase-resolved spectroscopy, i.e. measuring how the X-ray spectrum changes with QPO phase, provides the best test of this model against alternative interpretations, since precession will lead to a rocking of the  $\sim 6.4$  keV iron fluorescence line between Doppler red and blue shift over the course of each QPO cycle. We present a QPO phase-resolved spectral analysis of the bright black hole X-ray binary system GRS 1915+105 utilising simultaneous data from NICER and NuSTAR, using a novel method to track changes in the QPO centroid frequency during the course of the observation. The very high count rate and very broad band X-ray coverage ( $\sim 0.3$ -79 keV) provided by the combination of NICER and NuSTAR makes this an ideal dataset for our analysis.

### **Topic**

Multi-messenger and transient astronomy

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