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Discovery of 1 Hz quasi-periodic oscillations in an RXTE observation of MAXI J1543-564

ATel #3334; *D. Altamirano, M. Kalamkar, Y. Yang, N. Degenaar, R. Wijnands, (Amsterdam), P. Casella (Southampton), M. Linares (MIT), N. Rea (CSIC-IEEC), A. Watts, A. Patruno, M. Armas-Padilla, Y. Cavecchi, M. van der Klis, R. Kaur (Amsterdam)*

on 10 May 2011; 13:12 UT

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Subjects: X-ray, Binary, Black Hole, Neutron Star, Transient

Referred to by ATel #: [3336](#), [3341](#), [3355](#), [3359](#)

We report on an RXTE follow-up observation of the ongoing outburst of the newly discovered transient X-ray source MAXI J1543-564 (ATELs #[3330](#) and #[3331](#)). At ~2:08 UT on May 10th, 2011, RXTE observed MAXI J1543-564 for about 800 seconds (only PCU2 was active). The 2-60 keV power spectrum of this observation exhibits only a single ~10 sigma quasi-periodic oscillation at a frequency of $1.05^{+0.02}$ Hz. Its FWHM and fractional rms amplitude are $0.5^{+0.1}$ Hz and $22^{+1}\%$, respectively.

Assuming a Galactic absorption of $0.9e^{22}$ cm⁻² (as reported from Swift/XRT analysis, ATEL #[3331](#)), we find that the 3-25 keV PCA spectrum of the source is well described ($\chi^2/\text{dof} = 46.06/46$) by an absorbed powerlaw+gaussian model with a photon index of $1.8^{+0.2}$ (at a 90% confidence level). The 2-25 keV absorbed flux is $\sim 8e^{-10}$ ergs/cm². The energy of the gaussian needed was fixed to 6.5 keV; this component was required at a ~3.6 sigma level as estimated by an F-test. Its equivalent width is ~140 eV.

To compare with the Swift/XRT observation of May 8th (ATEL #[3331](#)), we extrapolated this model fit to lower energies. We estimate a 0.3-10 keV flux of $\sim 5.5e^{-10}$ erg/s/cm², or $9.6e^{-10}$ erg/s/cm² when corrected for absorption. These values are between 25 and 50 % higher than on May 8th, indicating that the source is still brightening. The $1.80^{+0.2}$ photon index we find is consistent within ~2 sigma level to that reported in ATEL #[3331](#).

The energy spectrum and X-ray variability of MAXI J1543-564 do not give yet conclusive evidence for the nature of the source (whether it is a black hole or a neutron star) and hence follow-up observations of the ongoing outburst are strongly encouraged.

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