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Orbital resolved spectroscopy of GX 301-2 with MAXI

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GX 301-2, a bright high-mass X-ray binary with an orbital period of 41.5 days, exhibits stable periodic orbital intensity modulations with a strong pre-periastron X-ray flare. Several models have been proposed to explain the accretion at different orbital phases, invoking accretion via stellar wind, equatorial disc, and accretion stream from the companion star. We present results from exhaustive orbital phase resolved spectroscopic measurements of GX 301-2 using data from the Gas Slit Camera onboard MAXI. Using spectroscopic analysis of the MAXI data with unprecedented orbital coverage for many orbits continuously, we have found a strong orbital dependence of the absorption column density and equivalent width of the iron emission line. A very large equivalent width of the iron line along with a small value of the column density in the orbital phase range 0.10–0.30 after the periastron passage indicates the presence of high density absorbing matter behind the neutron star in this orbital phase range. A low energy excess is also found in the spectrum at orbital phases around the pre-periastron X-ray flare. The orbital dependence of these parameters are then used to examine the various models about mode of accretion on to the neutron star in GX 301-2.

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