

## X-ray reprocessing in accreting pulsar GX 301-2 observed with Insight-HXMT

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### Abstract

We investigate the absorption and emission features in observations of GX 301-2 detected with Insight-HXMT/LE in 2017-2019. At different orbital phases, we found prominent Fe  $K\alpha$ ,  $K\beta$ , and Ni  $K\alpha$  lines, as well as Compton shoulders and Fe K-shell absorption edges. These features are due to the X-ray reprocessing caused by the interaction between the radiation from the source and surrounding accretion material. According to the ratio of iron lines ( $K\alpha$  and  $K\beta$ ), we infer the accretion material is in a low ionization state. We find an orbital-dependent local absorption column density, which has a large value and strong variability around the periastron. We explain its variability as a result of inhomogeneities of the accretion environment and/or instabilities of accretion processes. In addition, the variable local column density is correlated with the equivalent width of the iron  $K\alpha$  lines throughout the orbit, which suggests that the accretion material near the neutron star is spherically distributed.

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### Keywords

stars: neutron, X-rays: binaries, X-rays: individual: GX 301-2

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