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Possible detection of positrons from an accreting X-ray pulsar?

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Insight-HXMT is China’ s 1st X-ray astronomy satellite launched in 2017 and still working nominally in orbit. With its broad energy band (1-250 keV) and large effective area (about 400, 1000, 5000 cmˆ2 in three energy bands), it has been used to make many new discoveries with its observations on accreting X-ray pulsars, such as the highest energy cyclotron absorption features above 100 keV. Positrons are known to be produced in the Milky Way through some well-known mechanisms, however, unambiguous identifications of positron sources are still rare. In this talk, I will report the detection of a hard X-ray spectral component above 100 keV with the Insight-HXMT observations on an accreting X-ray pulsar with strong surface magnetic fields, on top of the cut-off powerlaw spectrum usually detected from such systems. This new spectral component can be modelled by the positronium continuum or electron-positron annihilation signals in a pair plasma.

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