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Compact X-ray jet as hot corona in the black hole X-ray binary MAXI J1820+070 observed with Insight-HXMT

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Insight-HXMT is China’s first X-ray astronomy satellite and was successfully launched on June 15th, 2017. It made extensive and broad band (1-250 keV) observations of the black hole X-ray binary MAXI J1820+070 during its most recent bright outburst. Timing analysis has found low-frequency quasi-periodic oscillations (LFQPOs) up to above 200 keV, the highest energy from any accreting black hole system. This cannot be explained in the previous models involving disk or extended corona, but is best interpreted as the precession of a compact X-ray jet relativistically moving away from the black hole. Broad band spectral analysis during the outburst revealed strong evolution of the reflection of the hard X-ray emission off the accretion disk. The observed evolution is inconsistent with the previously assumed static corona model from which the hard X-ray photons are produced, but is again best interpreted as relativistically outflowing jet-like hot plasma as the hard X-ray source, fully compatible with the compact X-ray jet revealed by the timing analysis.

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