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A new source of X-rays in GW170817 3.4 years after the merger

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GW170817 was detected 3.4 years ago as the first object to have both a gravitational wave and an EM counterpart. It provided the first confirmation of the connection between short gamma-ray bursts and binary neutron star mergers. For almost 3 years, the broadband EM observations of GW170817 from radio to X-rays showed a very well-behaved simple power-law spectrum, with no spectral evolution. The non-thermal emission across multiple wavelengths was best explained by a model with a structured jet viewed off-axis. However, observations after 3.4 years narrate a story different from expectations. We have observed a statistically significant excess in X-rays compared to the predictions from a structured jet model at the current epoch, which was not accompanied by an excess in radio. We investigate several theoretical models that could lead to such an excess in X-rays only, including a plausible emergence of a kilonova afterglow, which if true, would make it the first-ever to be observed. We finally discuss the implications of these observations on the nature of the merger remnant.

Primary author: HAJELA, Aprajita (Northwestern University)

Presenter: HAJELA, Aprajita (Northwestern University)

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