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The late-time afterglow of GW170817 and implications for jet dynamics (tbc)

GW170817 is the first binary neutron star merger detected with gravitational and electromagnetic waves, and its afterglow is still detectable 7 yr post-merger. Some previous studies of the X-ray afterglow have claimed the onset of a new afterglow component or raised concerns about the data processing techniques. Motivated thus, we present here a reanalysis of X-ray afterglow data for GW170817 and find potential sources of discrepancies between the data reduction techniques employed by various research groups. We also analyse the updated panchromatic afterglow data to find that there is no significant evidence for any new afterglow component (e.g. due to the ejecta that gave rise to the kilonova) and that the jet must be still in a mildly relativistic phase. The decline in the afterglow light curve is significantly shallower compared to that expected from the standard synchrotron afterglow jet models with sideways spreading, indicating either an additional energy injection at late times or the velocity dependence on the microphysics parameters. In this context, we discuss the implications of the late-time afterglow data on jet dynamics.

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