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Unusually long thermonuclear bursts from neutron stars

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Thermonuclear bursts from neutron stars in low-mass X-ray binaries are the subject of advanced research on accretion and nuclear burning processes. Depending on the accretion rate and composition of the stellar material, bursts lasting tens of minutes can be explained by the ignition of an unusually thick pure helium layer, though the role of hydrogen remains uncertain in some systems. Besides, hour-long superbursts powered by the explosive burning of carbon, produced through H/He burning, are thought to originate from a thicker deeper layer, thus probing the thermal profile of the neutron star crust.

This talk will review fifty years of observations revealing that about 1% only of thermonuclear bursts last more than 10 minutes. A unique sequence of an intermediate long burst immediately leading a superburst will also be presented as the former possibly being the firestarter of the latter.

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