



## Extremely Large EUV Late Phase of Solar Flares

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The second peak in the Fe XVI 33.5 nm line irradiance observed during solar flares by Extreme ultraviolet Variability Experiment (EVE) is known as Extreme UltraViolet (EUV) late phase. Our previous paper found that the main emissions in the late phase are originated from large-scale loop arcades that are closely connected to but different from the post flare loops (PFLs), and we also proposed that a long cooling process without additional heating could explain the late phase. In this paper, we define the extremely large late phase because it not only has a bigger peak in the warm 33.5 irradiance profile, but also releases more EUV radiative energy than the main phase. Through detailedly inspecting the EUV images from three point-of-view, it is found that, besides the later phase loop arcades, the more contribution of the extremely large late phase is from a hot structure that fails to erupt. This hot structure is identified as a flux rope, which is quickly energized by the flare reconnection and later on continuously produces the thermal energy during the gradual phase. Together with the late-phase loop arcades, the fail to erupt flux rope with the additional heating creates the extremely large EUV late phase.