Formation of the coronal mass ejection leading edge observed in the 2003 february 18 event

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This work reports the investigation of a typical coronal mass ejection (CME) observed in white light, Hα, EUV and X-ray by various instruments both in space and on ground on February 18, 2003. The Hα and EUV images indicate that the CME started with the eruption of a long filament located near the solar northwest limb. The white light coronal images show that the CME initiated with the rarefaction of a region above the solar limb and was followed by the formation of a bright arcade at altitude of 1.46 solar radii. The rarefying process synchronized the slow rising phase of the filament eruption, and the CME leading edge was observed to form as the filament eruption started to accelerate apparently. The lower part of the filament was brightened in Hα images at 01:50 UT and the flare ribbons on the solar surface became brightening in EIT 195 Å between 02:00 UT and 02:12 UT. In the GOES X-ray images, some parts of the filament was visible in the progress of lifting. The average acceleration of the CME in the first half hour was around 135 m s^{-2}, and the termination speed of the CME was about 1000 m s^{-1}.