

Is a Fast CME a Special Condition for Coronal Type II Bursts?

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Coronal Type II radio bursts appear to be emission stripes slowly drifting from high to low frequencies in the dynamic spectrum. It is well known that the drifting stripes are the signature of coronal shock waves associated with flares and/or coronal mass ejections (CMEs). Special conditions suggested for coronal Type II formation are (1) low Alfvén speeds and (2) fast coronal mass ejections.

In this paper, we have examined SOHO/LASCO CMEs having temporal and spatial closeness with Type IIs by using LASCO C2 and EIT running difference images. The longitudinal distribution of Type IIs associated with CMEs is examined and then compared with the distribution without CMEs. Under the assumption that the observed Type IIs are generated by CMEs, we have determined the formation heights of Type IIs associated with limb CMEs by using constant CME speeds and then compared the CME speed-height data at the initial time of Type II bursts with the Alfvén speed-height profile empirically determined. From these studies, we have found: (1) The type II bursts associated with CMEs do not strongly depend on longitude.; (2) There are many events which violate criteria for coronal shock formation.; and 3) The CME speeds satisfying the criteria have a better correlation with coronal shock speeds estimated from Type II data. Our results do not support that a fast CME is a special condition for coronal shock formation.