Type II shock speed from coronal density measurements and its comparison with CME kinematics

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Solar type II burst is regarded as a radio signature of solar coronal shock associated with flare and/or coronal mass ejection (CME). In general, the type II shock speed has been estimated from the emission frequency drifts of the burst by using a coronal density model. In this study, we derive a type II shock speed estimated from coronal density measurements, instead of the model, and compare it with CME kinematics. For this, we consider a type II burst by Green Bank Solar Radio Spectrometer (GBSRBS) and its associated limb CME by MLSO MK4 coronameter (1.08 - 2.85 solar radii) at 17:44 UT on 2004 August 18. The coronal density measurements were made from the inversion of MLSO coronal polarization brightness data taken just before the event time. The type II shock speed was estimated from the drift rate of the burst and the derived coronal density distribution. The estimated shock speed is then compared with the kinematics of associated CME front and flank deduced from the MK4 images. We have found that: (1) the derived electron density distribution along the path of CME flank agrees with the distribution of the one fold Newkirk model; (2) the type II emission heights determined from the density distribution are consistent with the heights of CME flank; (3) the derived type II shock speeds are quite similar to the speeds of CME flank. These results imply that the type II burst be generated at the CME flank in the high density streamer rather than the CME front.