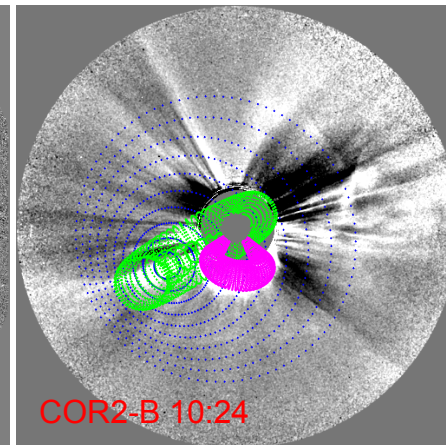
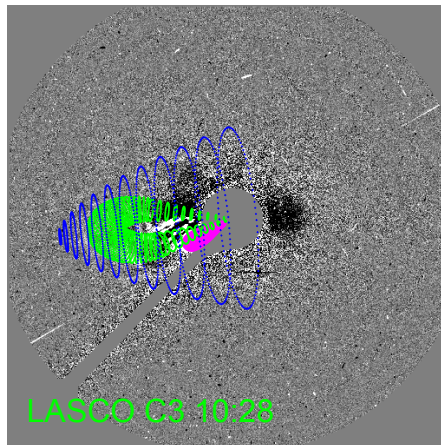
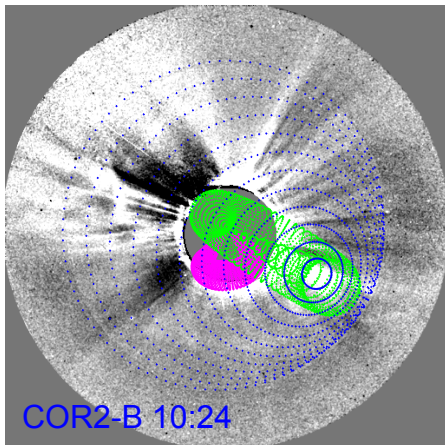


Forward Modeling of a CME Driven Shock : When is a Halo CME not a CME?

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24 FEBRUARY 2011



If this event had been seen from only the STEREO-A and B points of view, it might have been identified as a weak halo CME or incorrectly associated with a secondary slower CME.

Event Preliminaries

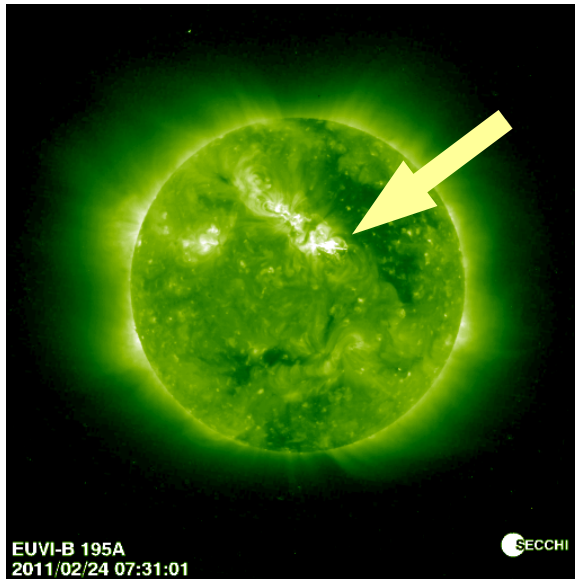
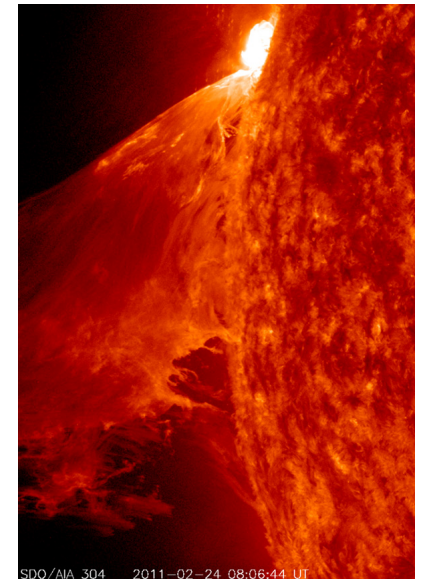
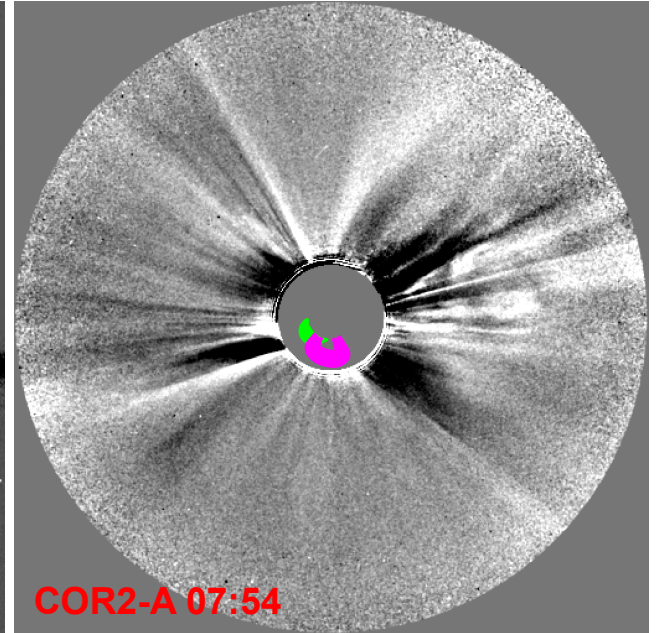
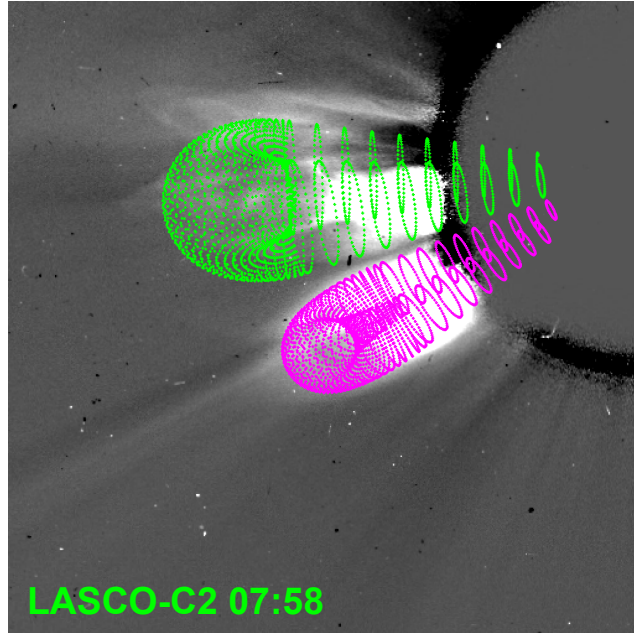
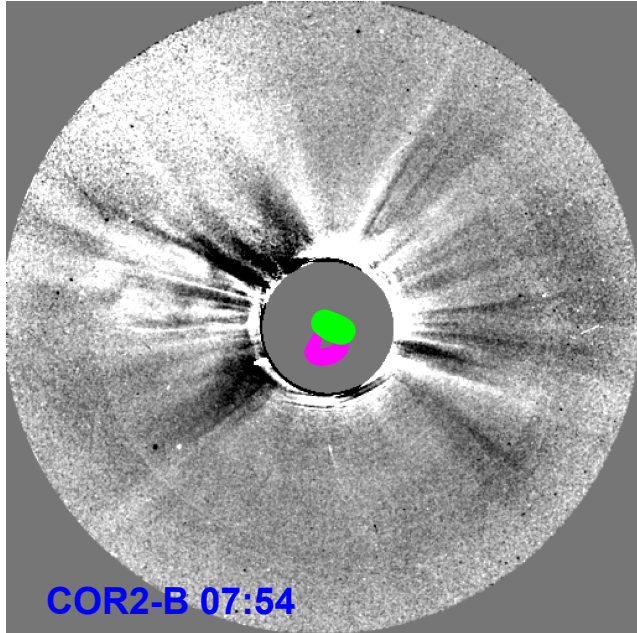
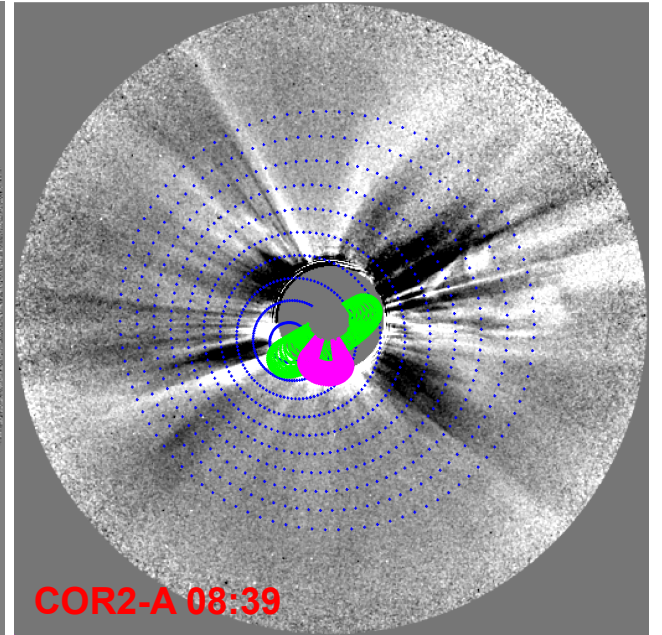
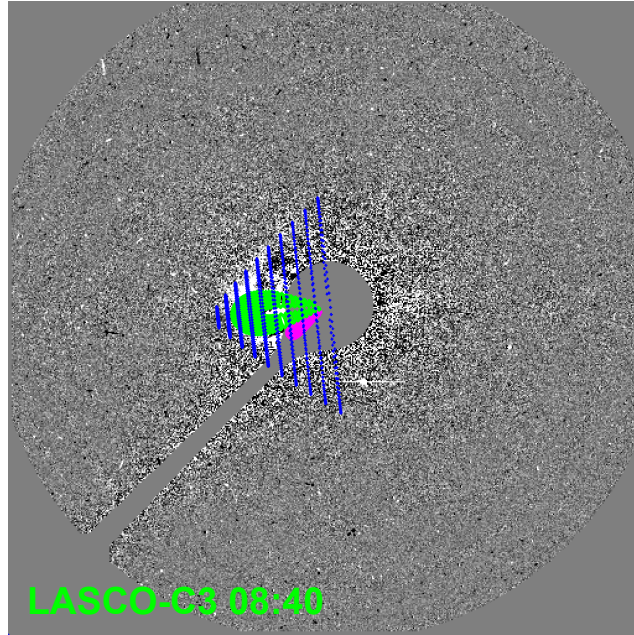
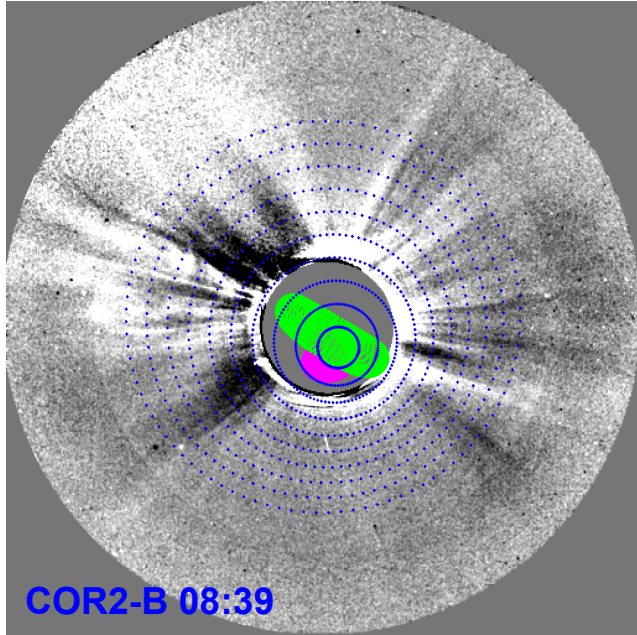


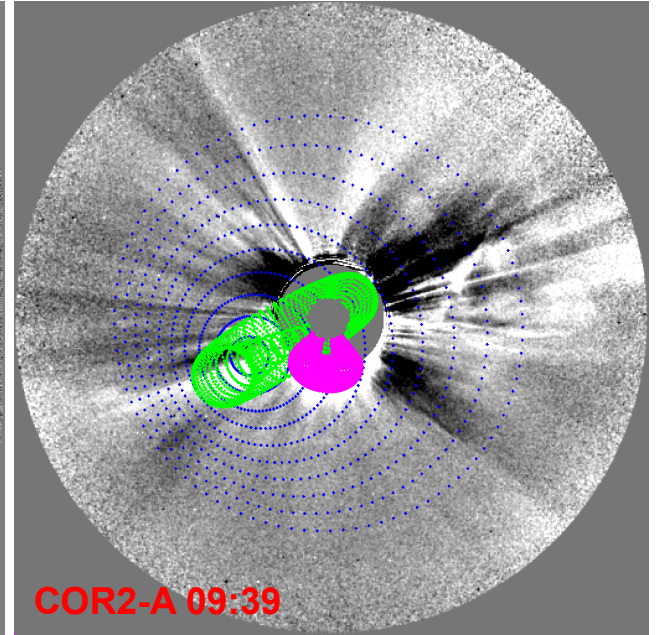
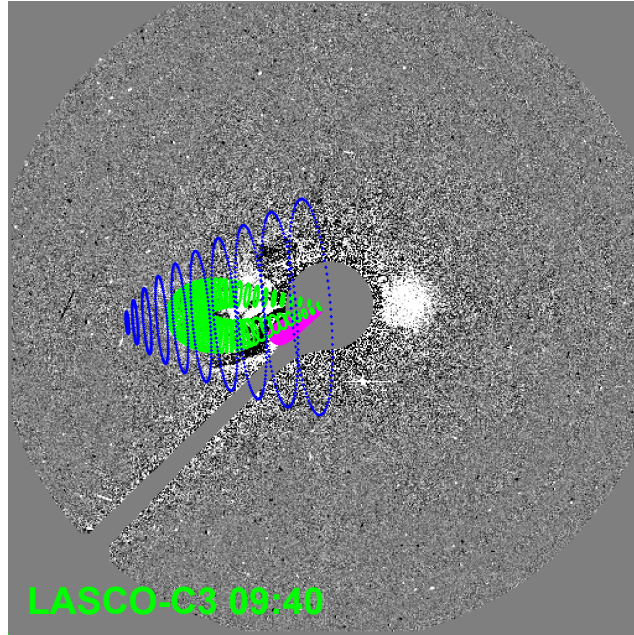
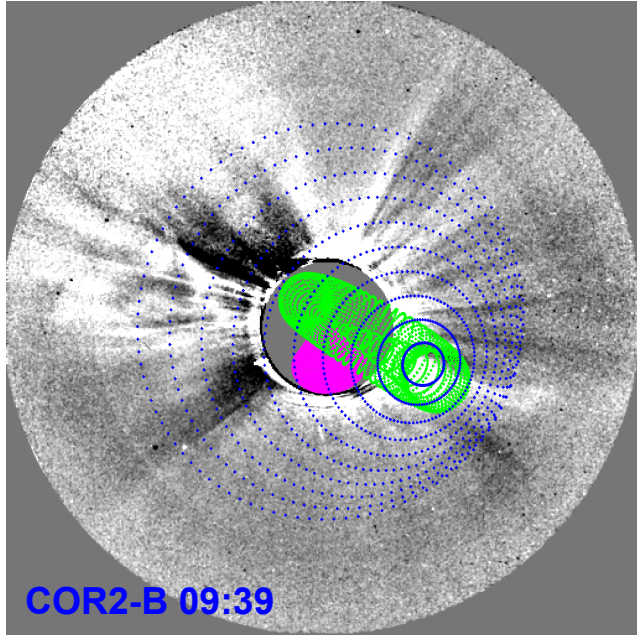
Fig 2 : STEREO-B EUVI 195 Å at 24 Feb 2011 07:31 UT. The CME originated from a flare observed disk center in the Northern hemisphere. It was observed at Earth by GOES as a M3.6 class x-ray flare.

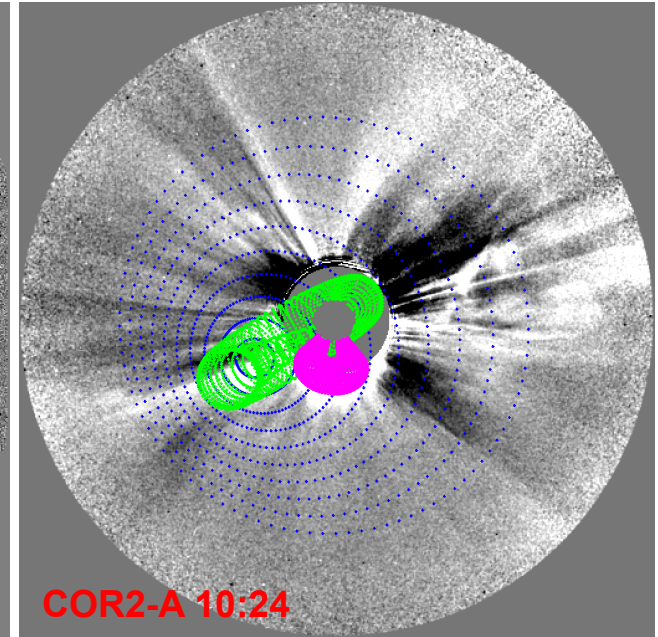
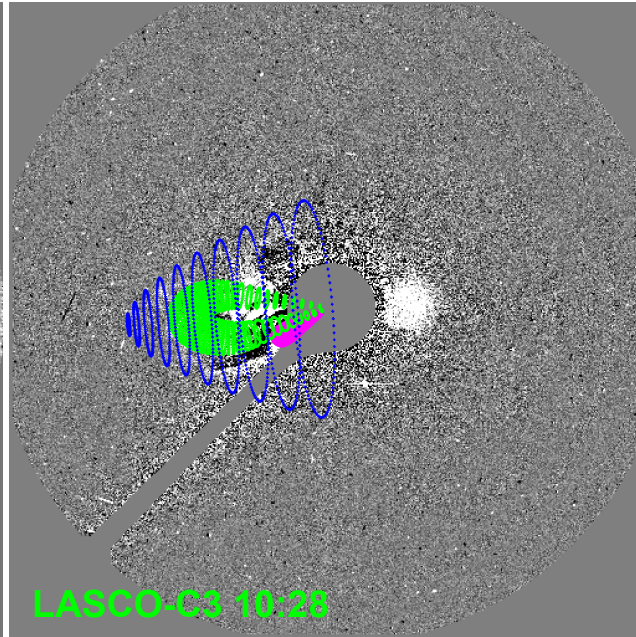
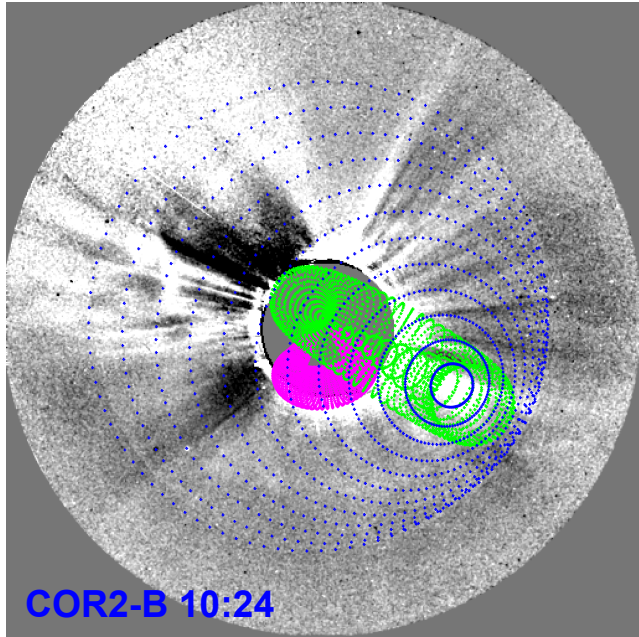
Fig 3 : SDO-AIA 304 Å at 24 Feb 2011 08:06 UT. The source region of the CME included a large prominence eruption observed in the 304 Å channel from EUVI-B and SDO-AIA. It was popularly called a 'monster prominence'. The prominence eruption lasted over 90 minutes and was oriented North-South.

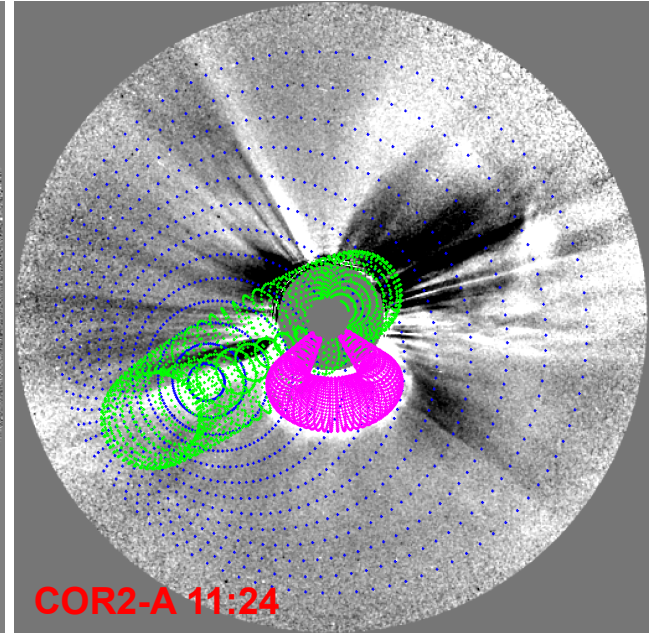
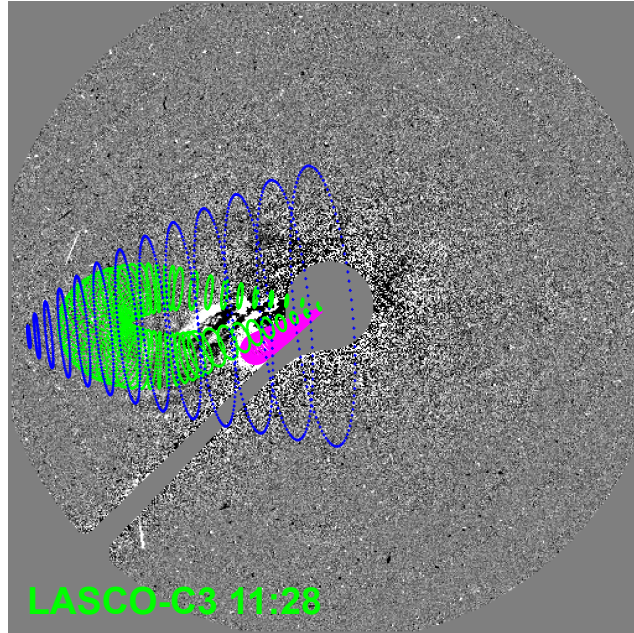
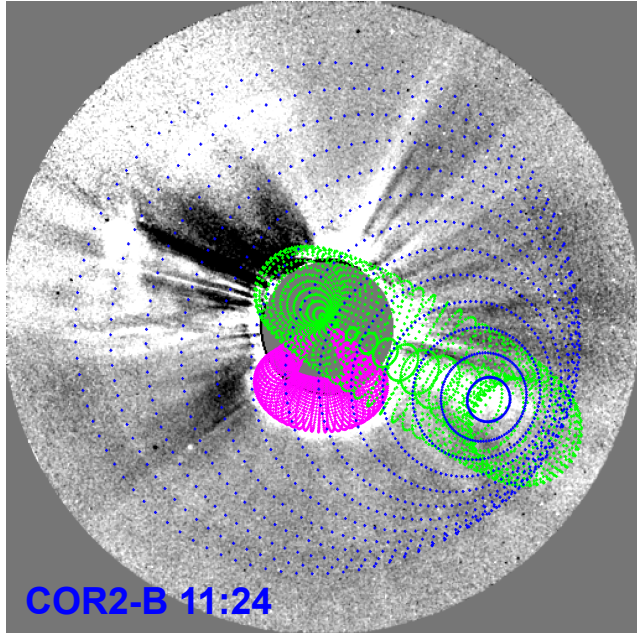












Velocity

	Linear Velocity (km/s)	Max 2 nd Order Velocity	Accel (m/s)
CME1			
3D	1199	1284	12.3
COR2-A	640	559	-25.8
COR2-B	603	697	21.0
LASCO	1057	1001	-8.6
CME2			
3D	283	718	16.3
COR2-A	279	426	10.9
COR2-B	362	465	12.0
LASCO	275	688	16.1
Shock			
3D	1194	718	-91.0
COR2-A	507	618	20.7
COR2-B	550	567	3.7

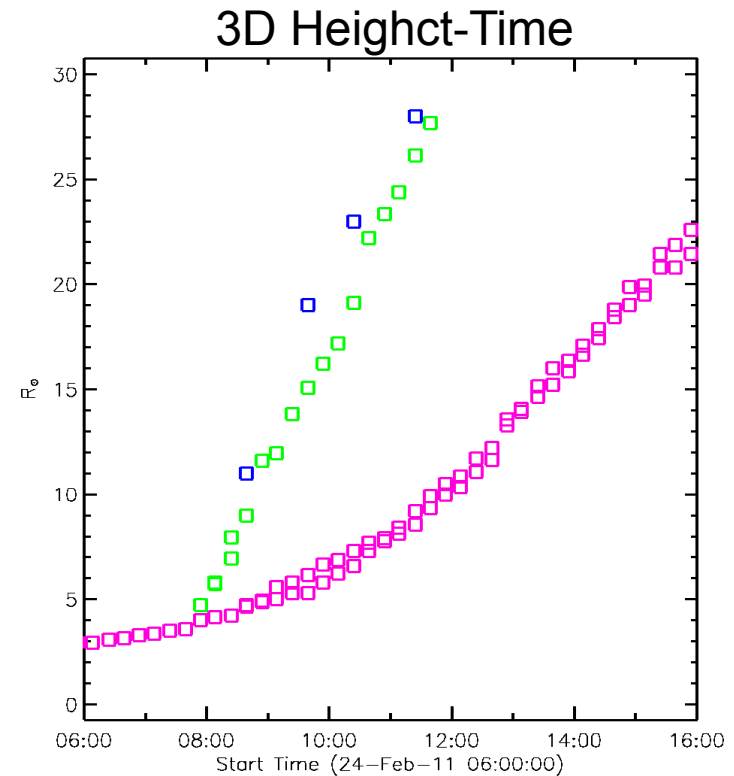


Fig 6 : The velocities of CME 1 and the shock are linear while CME 2 is accelerating

Velocity

	Linear Velocity (km/s)	Max 2 nd Order Velocity	Accel (m/s)
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3D	1199	1284	12.3
COR2-A	640	559	-25.8
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COR2-B Height-Time

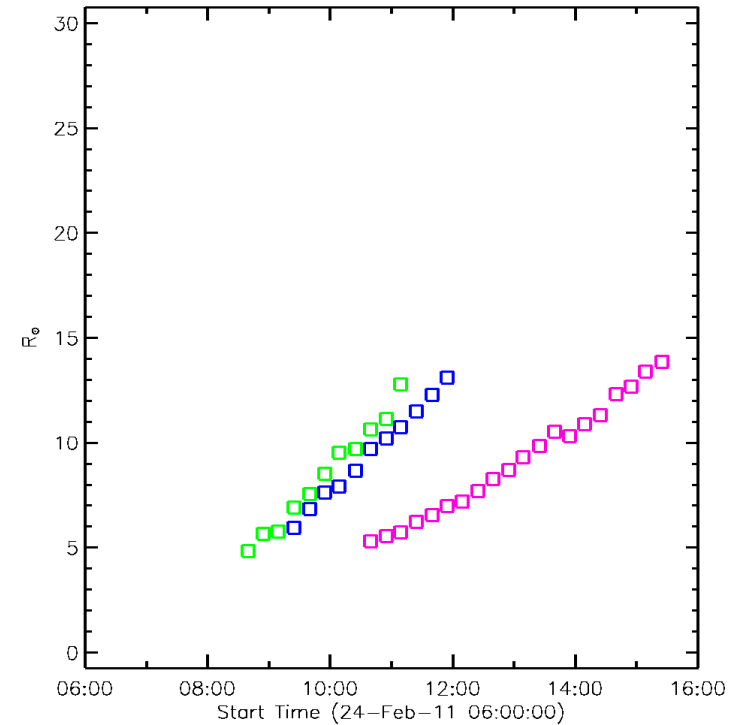
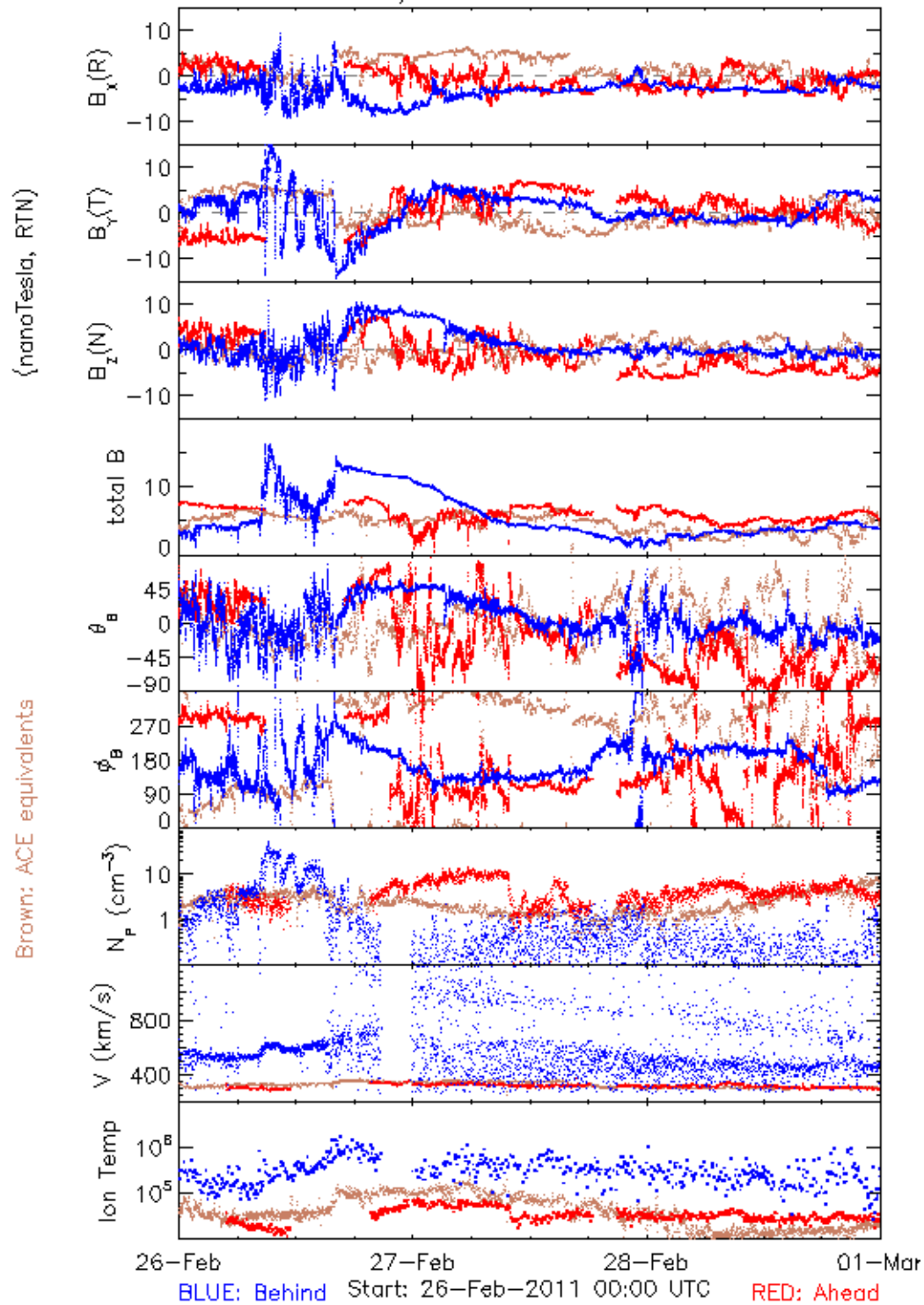


Fig 7 : The projected velocity does not show the difference in the two CME's velocity profiles.

IMPACT/PLASTIC 27-Feb-2011



Discussion

- The CME that is observed in the COR2 data with the shock is NOT driving the shock.
- This series of events requires at least 2 viewpoints to correctly interpret the coronagraph data.
- The velocity of the CMEs and the shock are significantly distorted by projection effects in the COR2 data.
- The CME shock driver is unmistakable in the LASCO data. However, the shock is very faint and could easily be missed.
- With the aid of the GCS model, we were able to identify a leg of the CME driving the shock in the COR2 data.
- The leg of CME 1 was detected by CACTus in COR2-A and B data with a width of 30° . It was not seen as a partial halo.
- The shock was observed in situ at STEREO-B with a significant magnetic field increase.
- Shocks could be observed in coronagraphic data without a visible CME driver.