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Streamer wave events observed with STEREO/COR2

Event analysis

- This event took place on February 6, 2013
- CME onset at 00:24UT, first sign of oscillation at 00:39UT
- Time-distance map below show a wave passing through the chosen slit
- Low cadence of STEREO A / COR2 results in a low time resolution in this map -> hard to derive the phase speed from time-distance map
- For phase speed measurement, we track the first bright wave crest or trough (486.5 km/s)

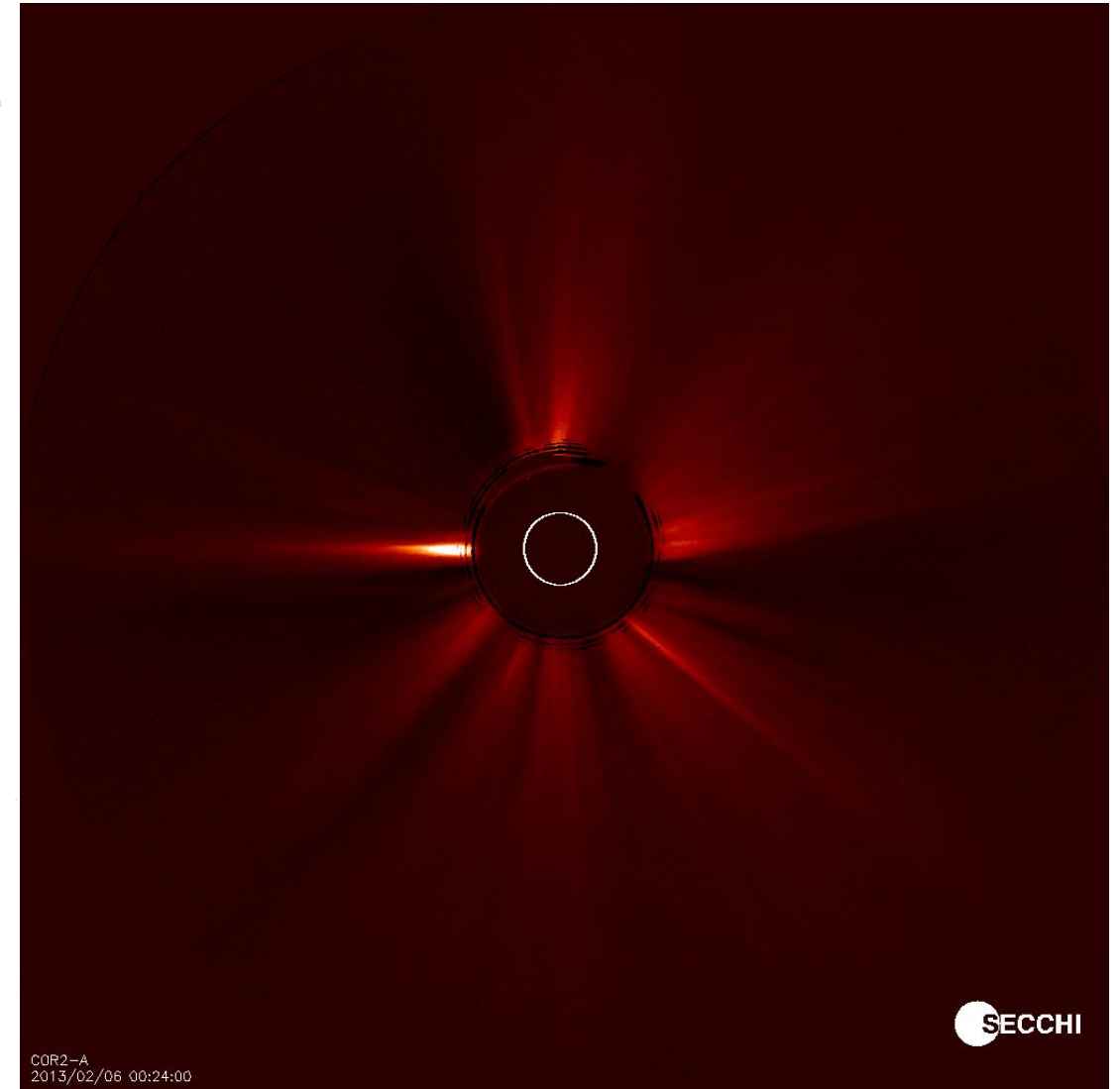
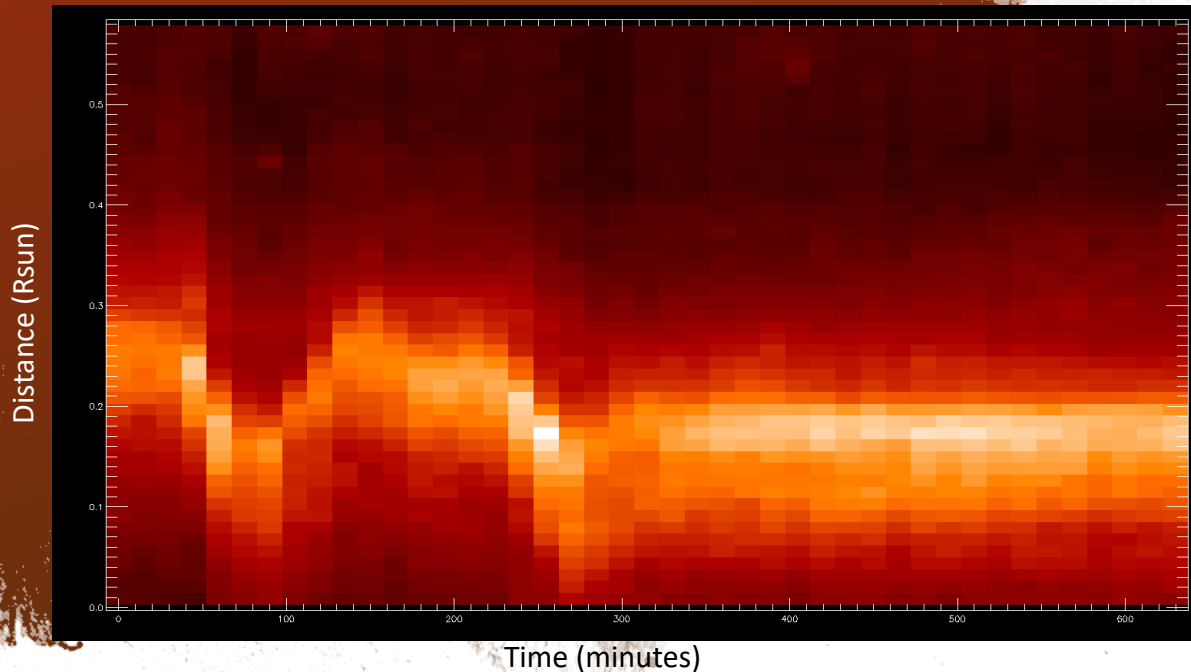
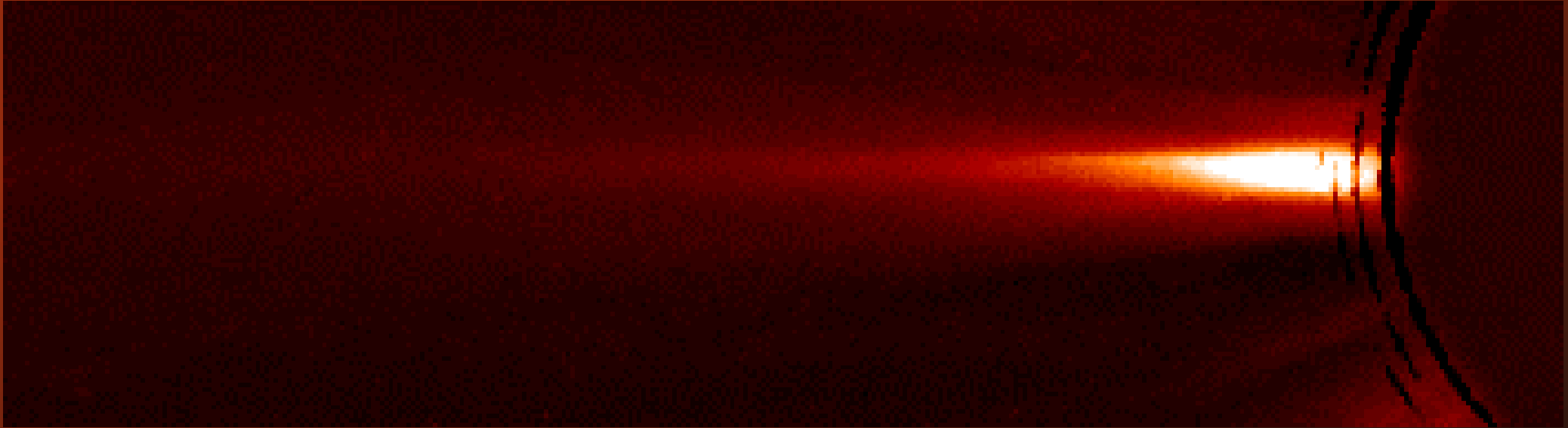
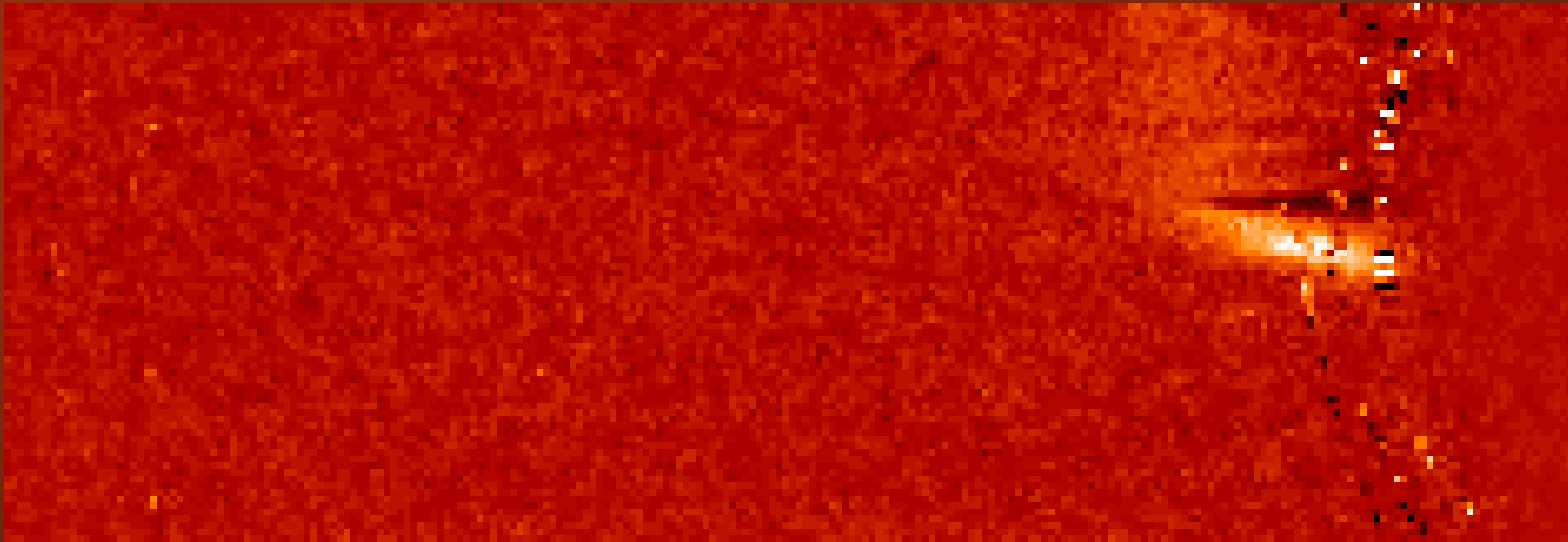


Figure : Time-distance map of the oscillation on 06-02-2013.



Zoom in on event on 06-02-2013. The oscillation is nicely visible in white-light.



- Zoom in on running differences of event on 06-02-2013. The alternating black and white patches are a clear indication of the oscillation.

Event list

- We found 16 streamer oscillation events in the STEREO A and B COR2 data from the start of the mission in 2007 until September 2017
- Selection was by going through the white-light images and running difference images
- All the oscillation events found were the result of a streamer being disturbed by a CME

Date	Visible from STEREO	CME				Streamer		
		Time (UT)	Speed (km/s)	CPA (deg)	Width (deg)	Start Oscillation (UT)	CPA (deg)	Phase speed (km/s)
17/05/2008	A	10:37	863	102	58	11:07	125	597
7/04/2011	A & B	12:24	457.5	210	90	12:54	280	662.1
27/04/2011	A & B	2:54	694	54	58	3:24	135	493.6
4/06/2011	A & B	22:24	1136	323	352	22:54	140	637.6
20/06/2011	A & B	18:24	431	274	86	18:39	250	407
4/08/2011	A	3:54	1193	22	234	4:54	324	537.5
11/05/2012	A	22:54	657	85	96	00:09+1	143	455.4
17/05/2012	B	2:24	781	323	352	2:39	219	571.9
14/06/2012	A	13:24	961	49	180	14:54	17	508.7
6/02/2013	A	0:24	543	30	74	0:39	90	486.5
13/03/2013	A & B	0:24	368	254	46	0:24	211	424.9
1/05/2013	A	3:24	833	301	104	3:39	10	490.6
1/05/2013	A	3:24	833	301	104	3:24	234	526.8
14/05/2013	A	21:24	781	339	268	23:39	11	640.7
27/05/2013	A	19:54	520	217	56	20:09	175	440.3
18/04/2014	A & B	10:54	892	153	304	14:24	97	312

For more information, check out the accompanying traditional poster

- The correlation factor between the phase speed and the CME speed is 0.28 -> no clear correlation
- Indication that the oscillation characteristics are bound to the properties of the streamer, and not to those of the CME

Speed comparison

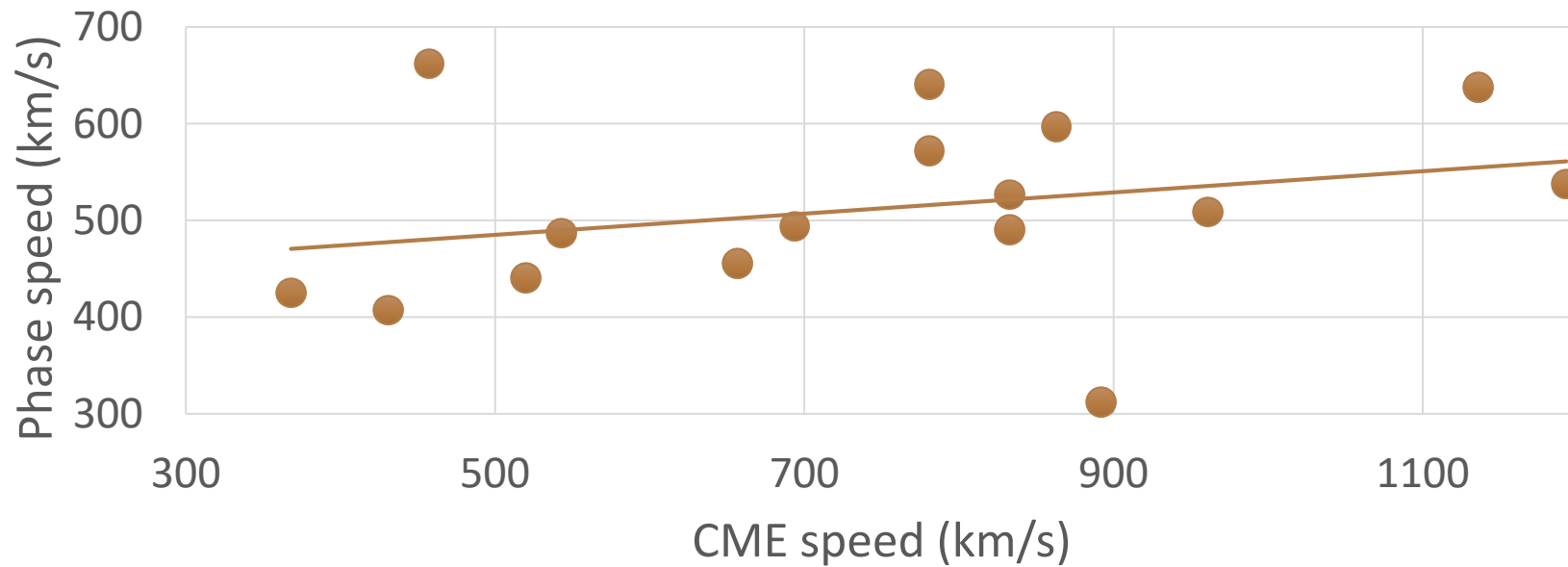


Figure: Scatter plot of the CME speed and the phase speed of the oscillations found in the survey

Future work

In the era of the STEREO mission, we have 3 coronagraphs at different locations (STEREO A and B / COR2 and SOHO / LASCO) which can give us different viewpoints on these unique events. Combining these viewpoints will give us new insights in the onset of these oscillations and how they relate to the physical properties of the coronal plasma in streamers.

Investigating these events in more depth and combining the data with new models for streamer waves can give us a new seismological tool to infer plasma parameters in the corona.