Geophysical Research Letters

Supporting Information for

Hubble Detects the Start of a New Saturn Ring Spoke Season

Amy A. Simon[1], Matthew M. Hedman[2], Philip D. Nicholson[3], Matthew S. Tiscareno[4], Mark R. Showalter[4], Troy McDonald[5], Samantha Callos[2]

[1] Solar System Exploration Division, NASA Goddard Space Flight Center, Greenbelt, Maryland, USA.

[2] Department of Physics, University of Idaho, Moscow, Idaho, USA.

[3] Department of Astronomy, Cornell University, Ithaca, New York, USA.

[4] SETI Institute, Mountain View, California, USA.

[5] Physics Department, United States Naval Academy, Annapolis, Maryland, USA.

*Corresponding author: Amy Simon (amy.simon@nasa.gov)

Contents of this file

Table S1. Hubble 2021 and 2022 images with spoke detections.

Image ID	Date	UTC	Filter	Notes
IEAQ31AEQ	12 Sept 2021, β=17.7°	10:28:17	F631N	1.75 and 1.78 R_S Spokes, Figs. 1, 4
IEAQ31AFQ		10:31:59	F502N	Fig. 4
IEAQ31AGQ		10:35:40	F395N	Fig. 4
IEAQ31AHQ		10:40:54	FQ727N	Fig. 4
IEAQ31AIQ		10:44:58	FQ727N	
IEAQ31AJQ		10:49:56	F763M	Figs. 1, 4
IEAQ31AKQ		10:51:57	F467M	Figs. 1, 4
IEAQ31ALQ		10:53:48	F275W	Fig. 4
IEAQ31AMQ		10:56:24	F275W	
IEAQ31ANQ		10:59:17	F343N	Fig. 4
IEAQ31AOQ		11:01:33	F631N	Figs. 1, 4
IEAQ31APQ		11:04:47	FQ889N	Fig. 4
IEMR34Z2Q	22 Sept 2022, β=13.3°	3:03:00	F631N	2022 HST Orbit 1, Figs. 2, 3, 4
IEMR34Z3Q		3:06:42	F502N	Figs. 3, 4
IEMR34Z4Q		3:10:23	F395N	Figs. 3, 4
IEMR34Z6Q		3:15:37	FQ727N	Figs. 3, 4
IEMR34Z7Q		3:19:41	FQ727N	
IEMR34Z8Q		3:24:39	F763M	Figs. 3, 4
IEMR34Z9Q		3:26:40	F467M	Figs. 3, 4
IEMR34ZAQ		3:28:43	F343N	Figs. 3, 4
IEMR34ZBQ		3:31:02	F225W	
IEMR34ZCQ		3:33:53	F225W	Figs. 3, 4
IEMR34ZDQ		3:37:34	FQ889N	Figs. 3, 4
IEMR40BAQ		12:47:13	FQ727N	HST Orbit 2, Fig. 4
IEMR40BBQ		12:51:17	FQ727N	
IEMR40BCQ		12:56:15	F763M	Fig. 4
IEMR40BDQ		12:58:16	F467M	Fig. 4
IEMR40BEQ		13:00:07	F275W	Fig. 4
IEMR40BFQ		13:02:43	F275W	
IEMR40BGQ		13:05:36	F343N	Fig. 4
IEMR40BHQ		13:07:55	F225W	Fig. 4
IEMR40BIQ		13:10:46	F225W	
IEMR40BJQ		13:13:57	F631N	Figs. 2, 3, 4
IEMR40BKQ		13:17:11	FQ889N	Fig. 4
IEMR41BM		14:09:17	F631N	HST Orbit 3, Figs. 2, 3, 4
IEMR41BN		14:12:59	F502N	Fig. 4
IEMR41BO		14:16:40	F395N	Fig. 4
IEMR41BP		14:21:54	FQ727N	Fig. 4
IEMR41BQ		14:25:58	FQ727N	
IEMR41BR		14:30:56	F763M	Fig. 4
IEMR41BS		14:32:57	F467M	Fig. 4
IEMR41BT		14:34:48	F275W	Spoke very faint or gone
IEMR41BU		14:37:24	F275W	
IEMR41BV		14:40:17	F343N	

IEMR41BW		14:42:36	F225W	
IEMR41BX		14:45:27	F225W	
IEMR41BY		14:48:38	F631N	Fig. 3
IEMR41BZ		14:51:52	FQ889N	

Table S2. Cassini 2013 and 2014 images with spoke detections.

Image ID	Observation Time
co-iss-w1761060314	2013-10-21 14:28:34.703
co-iss-w1761061720	2013-10-21 14:52:00.695
co-iss-w1761063126	2013-10-21 15:15:26.686
co-iss-w1761079998	2013-10-21 19:56:38.578
co-iss-w1761081404	2013-10-21 20:20:04.570
co-iss-w1761082810	2013-10-21 20:43:30.561
co-iss-w1761084216	2013-10-21 21:06:56.552
co-iss-w1761085622	2013-10-21 21:30:22.543
co-iss-w1761087028	2013-10-21 21:53:48.534
co-iss-w1761110930	2013-10-22 04:32:10.382
co-iss-w1761112336	2013-10-22 04:55:36.373
co-iss-w1761113742	2013-10-22 05:19:02.364
co-iss-w1761117960	2013-10-22 06:29:20.337
co-iss-w1761119366	2013-10-22 06:52:46.328
co-iss-w1761120772	2013-10-22 07:16:12.319
co-iss-w1761122178	2013-10-22 07:39:38.311
co-iss-w1761123584	2013-10-22 08:03:04.302
co-iss-w1761124990	2013-10-22 08:26:30.293
co-iss-w1761126396	2013-10-22 08:49:56.284
co-iss-w1761132020	2013-10-22 10:23:40.248
co-iss-w1761133426	2013-10-22 10:47:06.239
co-iss-w1761134832	2013-10-22 11:10:32.230
co-iss-w1761136238	2013-10-22 11:33:58.221
co-iss-w1761137644	2013-10-22 11:57:24.212
co-iss-w1767563761	2014-01-04 20:58:40.274
co-iss-w1767574407	2014-01-04 23:56:06.206
co-iss-w1767593565	2014-01-05 05:15:24.100
co-iss-w1767594428	2014-01-05 05:29:47.094
co-iss-w1767602195	2014-01-05 07:39:14.045
co-iss-w1767603058	2014-01-05 07:53:37.040
co-iss-w1767603921	2014-01-05 08:08:00.034

co-iss-w1767604784	2014-01-05 08:22:23.029
co-iss-w1767605647	2014-01-05 08:36:46.023
co-iss-w1770407449	2014-02-06 18:53:10.252
co-iss-w1770412369	2014-02-06 20:15:10.221
co-iss-w1770416589	2014-02-06 21:25:30.194
co-iss-w1770417985	2014-02-06 21:48:46.185
co-iss-w1770422329	2014-02-06 23:01:10.168
co-iss-w1770428145	2014-02-07 00:38:06.131
co-iss-w1773112686	2014-03-10 02:20:10.070
co-iss-w1784309122	2014-07-17 16:26:14.907
co-iss-w1784310922	2014-07-17 16:56:14.896
co-iss-w1784312722	2014-07-17 17:26:14.884
co-iss-w1784314522	2014-07-17 17:56:14.873