

TABLE I
Orbital Elements of 2006 November 19 Leonids (J2000).

Time UT	m_p magn.	m_v magn.	M g	H_b km	H_e km	R.A. geo _)	Decl. _)	$\langle V_g \rangle$ km/s	N	a AU	q AU	i _)	ω _)	Node _)	Q	F	s
04:02:00	-3.5	-0.9	0.33	141.0	93.2	155.32	+20.75	70.39_0.10	21	8.0	0.982	163.02	170.29	236.588	51.9	0.48	1.50
03:54:39	-3.2	-1.9	0.25	159.1	93.9	155.27	+20.52	70.54_0.09	30	8.8	0.982	163.44	170.17	236.583	38.1	0.43	1.70
05:01:51	-2.6	-0.2	0.14	133.6	92.7	155.37	+20.96	70.52_0.18	14	9.1	0.982	162.69	170.66	236.630	47.5	0.57	1.70
05:06:21	-2.4	-0.1	0.11	156.1	91.8	154.55	+20.83	71.15_0.24	22	6.6	0.985	163.32	172.88	236.633	40.9	0.58	1.80
05:19:56	-2.2	-0.1	0.092	124.8	93.5	154.53	+20.89	70.54_0.40	8	8.7	0.985	163.30	173.25	236.643	52.2	0.57	1.50
04:37:47	-0.4	+0.9	0.016	132.6	97.2	155.29	+20.69	70.90_0.29	11	12.7	0.982	163.22	170.66	236.613	35.3	0.41	2.00
04:50:50	+0.0	+1.5	0.011	126.2	98.0	154.72	+21.27	70.69_0.16	9	10.5	0.985	162.62	173.16	236.622	41.6	0.57	1.80
04:08:47	+0.8	+2.0	0.0047	118.7	96.1	154.89	+20.46	70.16_0.15	9	6.6	0.983	163.71	171.07	236.593	54.5	0.47	1.85
04:23:18	+1.1	+2.3	0.0035	118.0	99.3	155.33	+20.92	70.59_0.40	7	9.6	0.982	162.78	170.65	236.603	43.6	0.36	2.00
04:33:09	+1.1	+3.0	0.0035	123.0	97.2	154.61	+20.80	70.10_0.21	9	6.4	0.985	163.32	172.54	236.610	54.1	0.53	1.80
04:18:04	+1.2	+2.8	0.0032	118.4	100.9	155.40	+22.64	70.47_1.04	7	10.9	0.985	160.03	172.85	236.599	48.6	0.58	2.50
04:11:29	+1.4	+2.8	0.0026	119.5	99.6	153.98	+22.78	70.47_0.31	7	10.1	0.988	160.63	177.36	236.595	45.8	0.50	1.80
05:18:29	+1.4	+3.5	0.0026	120.4	97.0	154.52	+21.27	70.89_0.26	8	6.0	0.985	162.59	173.54	236.642	57.2	0.56	1.75
04:50:25	+1.5	+2.9	0.0024	118.4	100.7	152.24	+21.25	70.59_0.38	6	8.5	0.988	164.08	180.89	236.622	55.6	0.57	1.75
05:30:49	+1.6	+3.1	0.0021	127.7	100.4	154.74	+21.16	70.34_0.53	7	7.8	0.985	162.71	172.91	236.650	39.9	0.56	1.50
05:08:39	+1.6	+3.8	0.0021	120.2	100.7	155.35	+21.03	70.20_0.94	6	7.2	0.982	162.52	170.65	236.635	44.2	0.42	1.75
05:23:46	+1.7	+4.5	0.0019	118.9	97.5	154.72	+20.97	71.20_0.73	7	19.2	0.985	163.17	173.04	236.645	55.8	0.60	1.70
05:48:11	+1.7	+2.8	0.0019	117.8	99.3	154.92	+21.00	70.65_0.73	7	9.9	0.984	162.91	172.29	236.663	47.5	0.62	1.70
05:01:05	+2.0	+4.8	0.0014	118.3	97.0	154.50	+20.97	71.12_0.33	8	16.5	0.985	163.30	173.61	236.630	45.8	0.60	1.60
05:15:58	+2.0	+4.4	0.0014	122.7	102.1	154.21	+21.32	70.11_0.43	7	6.6	0.986	162.74	174.67	236.640	50.9	0.54	1.70
05:03:56	+2.2	+4.4	0.0012	115.7	102.0	154.28	+21.89	70.66_0.85	5	10.8	0.987	161.90	175.42	236.632	52.3	0.64	1.80
04:39:50	+2.3	+3.9	0.0011	118.4	101.7	154.68	+20.46	70.12_0.47	5	6.3	0.984	163.82	170.82	236.615	49.6	0.67	1.50
04:26:47	+2.4	+4.9	0.0010	121.6	99.4	154.25	+21.48	70.65_0.43	7	10.1	0.986	162.55	174.83	236.605	49.0	0.44	1.90
04:10:20	+2.6	+3.9	0.0008	122.0	101.3	154.91	+20.71	70.79_0.41	9	11.0	0.983	163.40	171.72	236.594	47.3	0.65	1.50
Observed	(median):			121.0	98.7	154.72	+20.97	70.57		9.0	0.985	162.97	172.87	236.622		0.57	1.75
	N=24	σ		_11.5	_3.1	_0.67	_0.58	_0.32†		_3.2†††††	0.002	0.91	2.49	0.022		_0.08†††	_0.22
Predicted	(2-rev):					154.82	+20.90	70.91		11.16	0.9864	163.15	173.90	236.624			
	N=47	σ				_0.23	_0.08	_0.05†		_0.04	0.0004	0.03	0.37	0.080			

Legend: m_p = visual magnitude at $d = 100$ km from photometry; m_p = apparent vis. mag. at $d = 100$ km (visual inspection tape) ; M = mass; $H_b + H_e$ = begin + end height; R.A., Decl., and V_g = geocentric radiant and speed (no gravity); N = # breaks; q = perihelion distance; a = semi-major axis; i = inclination; ω = argument of perihelion; Q = convergence angle; F = relative position of the peak of light curve; s = differential mass distribution index of fragments.

