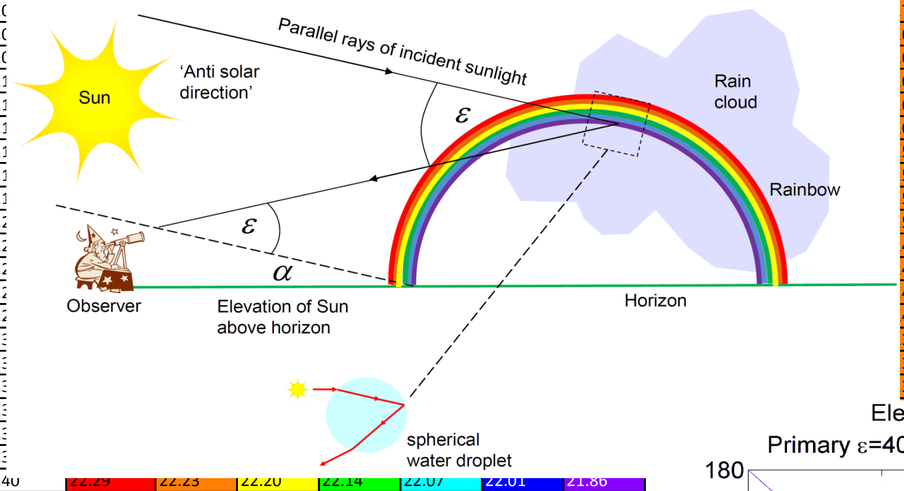
DESCARTES' MODEL OF A RAINBOW

Dr Andrew French. July 2020

PRIMARY BOW

	Red	Orange	Yellow	Green	Cyan	Blue	Violet
f/THz	442.5	495	520	565	610	650	735
n	1.3310	1.3321	1.3327	1.3338	1.3350	1.3362	1.3390

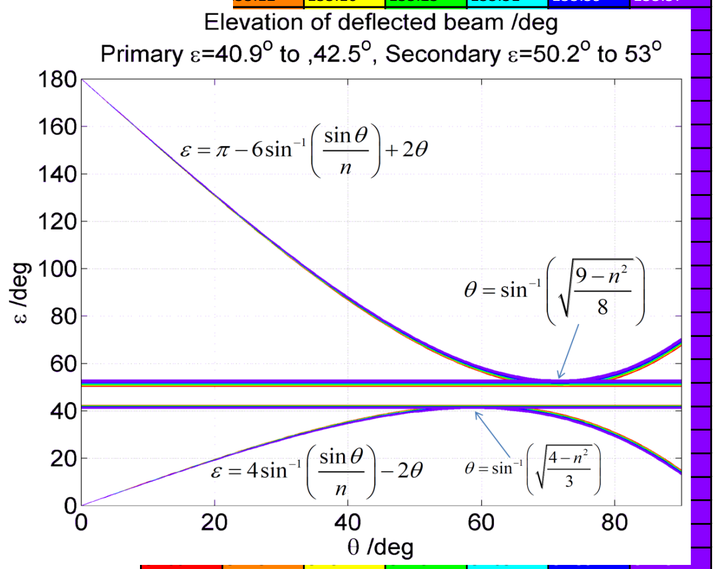
theta /deg	theta /rad	epsilon /deg	epsilon /deg	epsilon /deg	epsilon /deg	epsilon /deg	epsilon /deg	epsilon /deg
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.02	1.01	1.00	1.00	1.00	1.00	0.99	0.99
2	0.0							
3	0.0							
4	0.0							
5	0.0							
6	0.1							
7	0.1							
8	0.1							
9	0.1							
10	0.1							
11	0.1							
12	0.2							
13	0.2							
14	0.2							
15	0.2							
16	0.2							
17	0.3							
18	0.3							
19	0.3							
20	0.3							
21	0.3							
22	0.3							
23	0.40	22.29	22.23	22.20	22.14	22.07	22.01	21.86
24	0.42	23.17	23.11	23.08	23.02	22.95	22.89	22.73
25	0.44	24.05	23.99	23.95	23.89	23.83	23.75	23.59
26	0.45	24.92	24.85				24.61	24.44
27	0.47	25.77	25.70				25.45	25.27
28	0.49	26.62	26.54				26.28	26.10
29	0.51	27.44	27.37				27.09	26.91
30	0.52	28.26	28.18				27.90	27.70
31	0.54	29.06	28.98				28.68	28.48
32	0.56	29.85	29.76				29.46	29.25
33	0.58	30.62	30.53				30.22	30.00
34	0.59	31.37	31.28				30.96	30.73
35	0.61	32.11	32.02				31.68	31.45
36	0.63	32.83	32.73				32.39	32.15
37	0.65	33.53	33.43				33.07	32.83
38	0.66	34.21	34.11				33.74	33.49
39	0.68	34.87	34.77				34.39	34.13
40	0.70	35.51	35.40				35.02	34.75
41	0.72	36.13	36.02				35.62	35.35
42	0.73	36.72	36.61				36.20	35.92
43	0.75	37.29	37.18	37.12	37.01	36.88	36.76	36.47
44	0.77	37.84	37.72	37.66	37.55	37.42	37.29	37.00
45	0.79	38.36	38.24	38.18	38.06	37.93	37.80	37.50
46	0.80	38.86	38.74	38.67	38.55	38.41	38.28	37.97
47	0.82	39.33	39.20	39.13	39.01	38.87	38.74	38.42
48	0.84	39.76	39.64	39.57	39.44	39.30	39.16	38.84
49	0.86	40.17	40.04	39.97	39.84	39.69	39.56	39.23
50	0.87	40.55	40.42	40.35	40.21	40.06	39.92	39.58
51	0.89	40.90	40.76	40.69	40.55	40.40	40.25	39.91
52	0.91	41.21	41.07	41.00	40.85	40.70	40.55	40.20
53	0.93	41.49	41.34	41.27	41.13	40.97	40.82	40.46
54	0.94	41.73	41.58	41.51	41.36	41.20	41.04	40.68
55	0.96	41.94	41.79	41.71	41.56	41.39	41.24	40.86
56	0.98	42.10	41.95	41.87	41.72	41.55	41.39	41.01
57	0.99	42.23	42.08	42.00	41.84	41.67	41.51	41.12

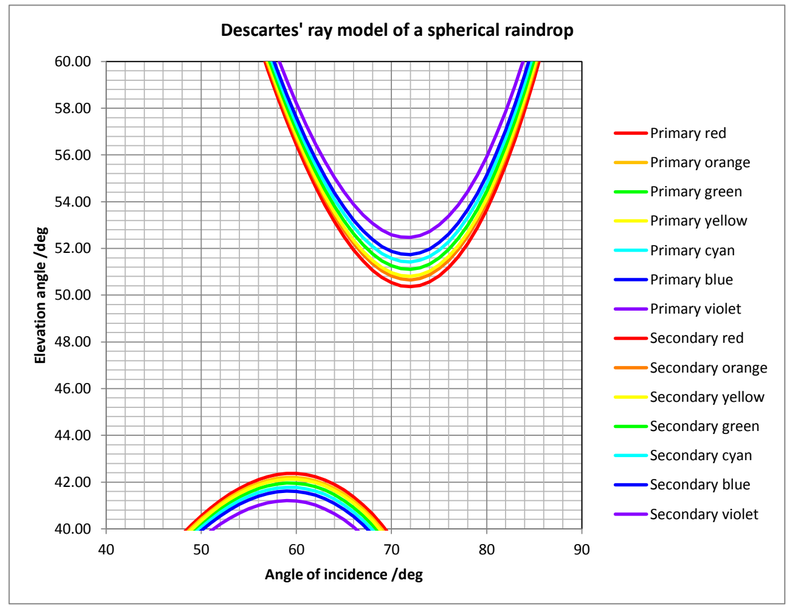


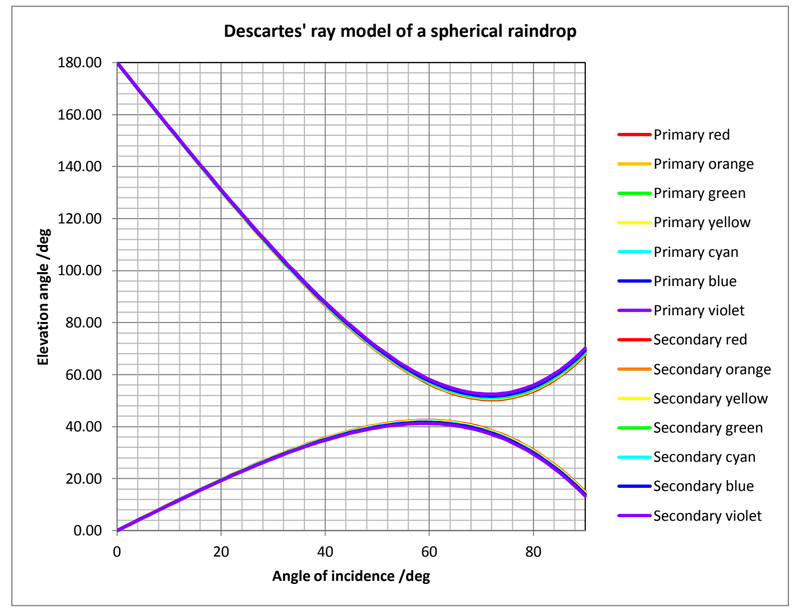
SECONDARY BOW

	Red	Orange	Yellow	Green	Cyan	Blue	Violet
f/THz	442.5	495	520	565	610	650	735
n	1.3310	1.3321	1.3327	1.3338	1.3350	1.3362	1.3390

epsilon /deg	epsilon /deg	epsilon /deg	epsilon /deg	epsilon /deg	epsilon /deg	epsilon /deg
180.00	180.00	180.00	180.00	180.00	180.00	180.00
177.49	177.50	177.50	177.50	177.51	177.51	177.52
	174.99	175.00	175.00	175.01	175.02	175.04
	172.49	172.50	172.51	172.52	172.53	172.56
	169.99	170.00	170.01	170.03	170.05	170.08
	167.49	167.50	167.52	167.54	167.56	167.61
	165.00	165.01	165.03	165.06	165.08	165.14
	162.51	162.52	162.55	162.57	162.60	162.67
	160.02	160.03	160.06	160.10	160.13	160.21
	157.54	157.55	157.59	157.63	157.66	157.75
	155.06	155.08	155.12	155.16	155.20	155.29
	152.59	152.61	152.65	152.70	152.74	152.85
	150.12	150.15	150.19	150.24	150.29	150.41
	147.67	147.69	147.74	147.80	147.85	147.97
	145.22	145.25	145.30	145.36	145.41	145.55
	142.78	142.81	142.87	142.93	142.99	143.13
	140.35	140.38	140.44	140.51	140.57	140.73
	137.93	137.96	138.03	138.10	138.17	138.33
	135.52	135.55	135.62	135.70	135.77	135.94
	133.12	133.16	133.23	133.31	133.39	133.57
79.24	79.41	79.50	79.68	79.87	80.06	80.50
77.46	77.64	77.73	77.91	78.11	78.30	78.75
75.71	75.90	75.99	76.18	76.38	76.58	77.04
74.01	74.20	74.30	74.49	74.70	74.90	75.37
72.35	72.55	72.65	72.84	73.05	73.26	73.74
70.74	70.94	71.04	71.24	71.46	71.67	72.16
69.17	69.38	69.48	69.68	69.91	70.12	70.63
67.65	67.86	67.97	68.18	68.40	68.62	69.14
66.19	66.40	66.51	66.72	66.95	67.17	67.70
64.77	64.98	65.10	65.31	65.55	65.78	66.32
63.40	63.62	63.74	63.96	64.20	64.43	64.98
62.09	62.32	62.44	62.66	62.91	63.14	63.71
60.84	61.07	61.19	61.42	61.67	61.91	62.49
59.65	59.88	60.01	60.24	60.50	60.74	61.33







58	1.01	42.32	42.16	42.08	41.92	41.75	41.58	41.18
59	1.03	42.36	42.20	42.12	41.96	41.78	41.61	41.21
60	1.05	42.37	42.20	42.12	41.95	41.77	41.60	41.19
61	1.06	42.32	42.15	42.07	41.90	41.72	41.54	41.12
62	1.08	42.23	42.06	41.97	41.80	41.62	41.44	41.01
63	1.10	42.09	41.92	41.83	41.66	41.47	41.28	40.85
64	1.12	41.90	41.73	41.64	41.46	41.27	41.08	40.64
65	1.13	41.66	41.49	41.39	41.21	41.02	40.83	40.39
66	1.15	41.37	41.19	41.10	40.92	40.72	40.53	40.07
67	1.17	41.03	40.84	40.75	40.56	40.36	40.17	39.71
68	1.19	40.62	40.44	40.34	40.15	39.95	39.75	39.29
69	1.20	40.16	39.97	39.88	39.69	39.48	39.28	38.81
70	1.22	39.64	39.45	39.35	39.16	38.95	38.75	38.27
71	1.24	39.07	38.87	38.77	38.58	38.37	38.16	37.68
72	1.26	38.42	38.23	38.13	37.93	37.72	37.51	37.02
73	1.27	37.72	37.52	37.42	37.22	37.00	36.79	36.30
74	1.29	36.95	36.75	36.65	36.45	36.23	36.02	35.52
75	1.31	36.11	35.91	35.81	35.60	35.38	35.17	34.66
76	1.33	35.21	35.01	34.90	34.70	34.47	34.26	33.75
77	1.34	34.24	34.03	33.93	33.72	33.49	33.28	32.76
78	1.36	33.20	32.99	32.88	32.67	32.44	32.23	31.71
79	1.38	32.08	31.87	31.76	31.55	31.32	31.10	30.58
80	1.40	30.89	30.68	30.57	30.36	30.13	29.91	29.38
81	1.41	29.63	29.42	29.31	29.10	28.86	28.64	28.11
82	1.43	28.30	28.08	27.97	27.76	27.52	27.30	26.77
83	1.45	26.88	26.67	26.56	26.34	26.11	25.88	25.35
84	1.47	25.39	25.18	25.07	24.85	24.62	24.39	23.85
85	1.48	23.83	23.61	23.50	23.28	23.05	22.82	22.28
86	1.50	22.18	21.97	21.86	21.64	21.40	21.17	20.63
87	1.52	20.46	20.24	20.13	19.91	19.67	19.45	18.90
88	1.54	18.66	18.44	18.33	18.11	17.87	17.64	17.10
89	1.55	16.78	16.56	16.45	16.23	15.99	15.76	15.22
90	1.57	14.82	14.60	14.49	14.27	14.03	13.80	13.26

58.52	58.76	58.88	59.12	59.38	59.63	60.23
57.45	57.69	57.82	58.06	58.33	58.58	59.19
56.45	56.70	56.83	57.07	57.34	57.60	58.22
55.52	55.77	55.90	56.15	56.42	56.69	57.32
54.65	54.91	55.04	55.30	55.58	55.84	56.48
53.86	54.12	54.25	54.51	54.80	55.07	55.72
53.14	53.41	53.54	53.81	54.10	54.37	55.03
52.50	52.77	52.91	53.18	53.47	53.75	54.42
51.94	52.21	52.35	52.63	52.92	53.21	53.89
51.46	51.74	51.88	52.16	52.46	52.75	53.44
51.07	51.34	51.49	51.77	52.08	52.37	53.07
50.76	51.04	51.18	51.47	51.78	52.08	52.78
50.53	50.82	50.97	51.26	51.57	51.87	52.59
50.40	50.69	50.84	51.13	51.45	51.76	52.48
50.36	50.66	50.81	51.10	51.43	51.74	52.47
50.42	50.72	50.87	51.17	51.49	51.81	52.55
50.57	50.87	51.03	51.33	51.66	51.98	52.73
50.83	51.13	51.29	51.59	51.93	52.25	53.00
51.18	51.49	51.65	51.96	52.29	52.61	53.38
51.64	51.95	52.11	52.42	52.76	53.09	53.86
52.21	52.52	52.68	52.99	53.33	53.66	54.44
52.88	53.19	53.36	53.67	54.01	54.35	55.13
53.66	53.98	54.14	54.46	54.80	55.14	55.93
54.55	54.87	55.04	55.35	55.70	56.04	56.83
55.56	55.88	56.04	56.36	56.71	57.05	57.85
56.67	57.00	57.16	57.49	57.84	58.18	58.98
57.91	58.23	58.40	58.72	59.08	59.42	60.22
59.26	59.58	59.75	60.08	60.43	60.77	61.58
60.72	61.05	61.22	61.54	61.90	62.24	63.06
62.31	62.63	62.80	63.13	63.49	63.83	64.65
64.01	64.34	64.51	64.83	65.19	65.54	66.35
65.83	66.16	66.33	66.66	67.01	67.36	68.18
67.77	68.10	68.27	68.60	68.96	69.30	70.12