

RINGS

Project Specifications

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Rings are numbered from left to right; at every .45 cm. There are a total of 39 Rings Ring-1 to Ring-39.

Every .45 cm. there exists a Ring's H-Position: 0.45, 0.9, 1.35, 1.8, 2.25, and 2.7, etc. (39 numbers from left to right).

Each of the Ring's Color Transparencies, have a specific X-Par Diameter size; not the Ring, just the clear plastic which is inserted into the Ring. X-Par sizes range from as small as 5.620498199 cm to 18 cm. big.

Definitions:

Ring-1 (N-20)

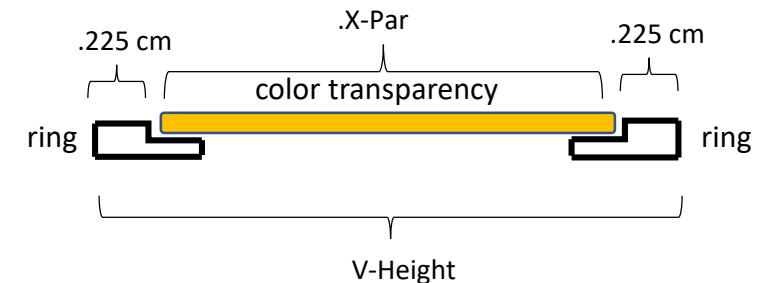
H-Position: 0.45 cm

X-Par: 5.620498199 cm

V-Height: 6.070498199 cm

The Ring graphic pictures are catalogued under 2 group: "N" & "P". The "N" Group is the "negative" or left-hand group and the "P" Group is the "positive" or the right-hand Group. The numbers range from : N-20 -> N-2 (left-side) to ranges P-1 -> P-20 (right-side); for a total of 39.

When the Color Transparency is mounted to the Ring, there will be a "lip" extension which increases the size of the Ring from X-Par to a size 0.45 cm larger (which is a 0.225 cm extension around the Ring).

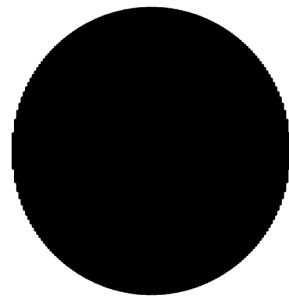


Ring-1 (N-20)

H-Position: 0.45 cm

X-Par: 5.620498199 cm

V-Height: 6.070498199 cm

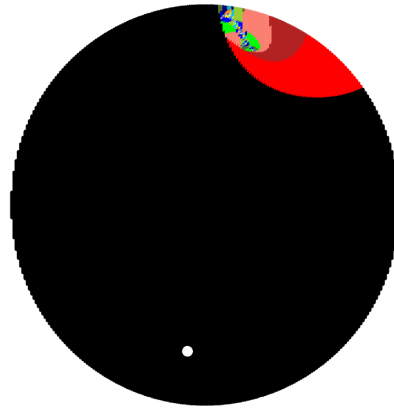


Ring-2 (N-19)

H-Position: 0.9 cm

X-Par: 7.846018098 cm

V-Height: 8.296018098

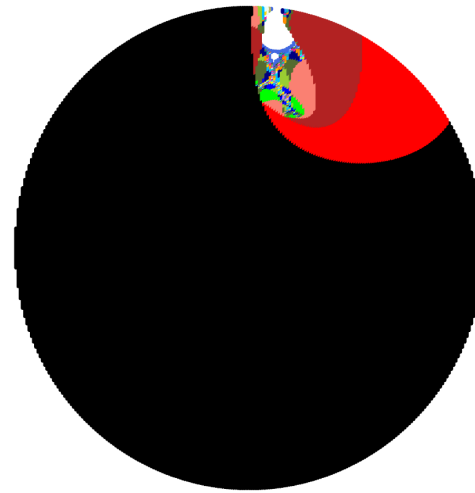


Ring-3 (N-18)

H-Position: 1.35 cm

X-Par: 9.482088378 cm

V-Height: 9.932088378

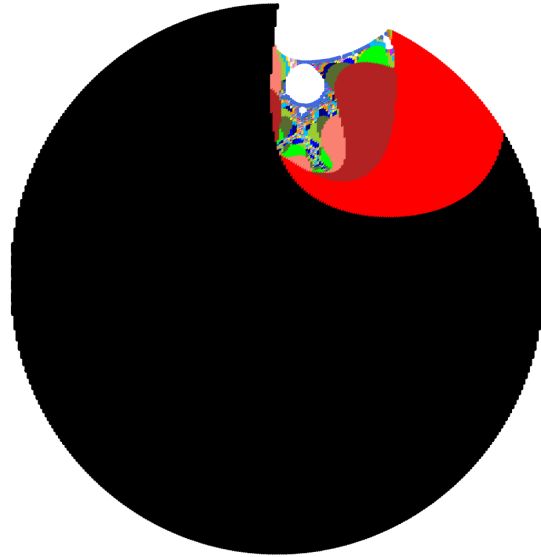


Ring-4 (N-17)

H-Position: 1.8 cm

X-Par: 10.8 cm

V-Height: 11.25 cm

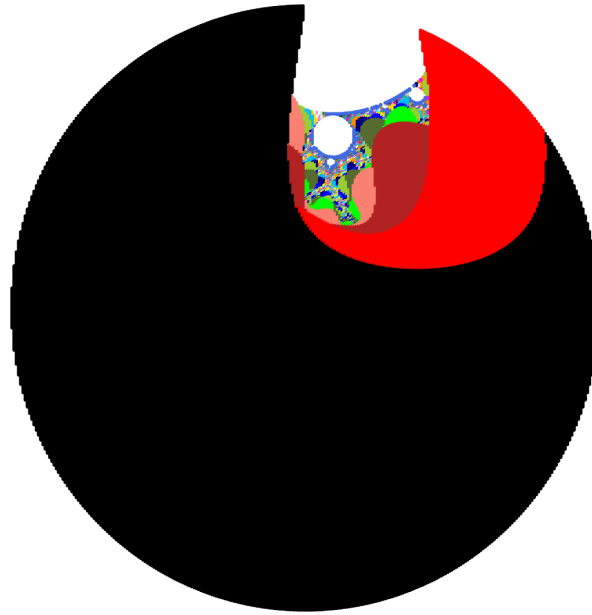


Ring-5 (N-16)

H-Position: 2.25 cm

X-Par: 11.9058809 cm

V-Height: 12.3558809 cm

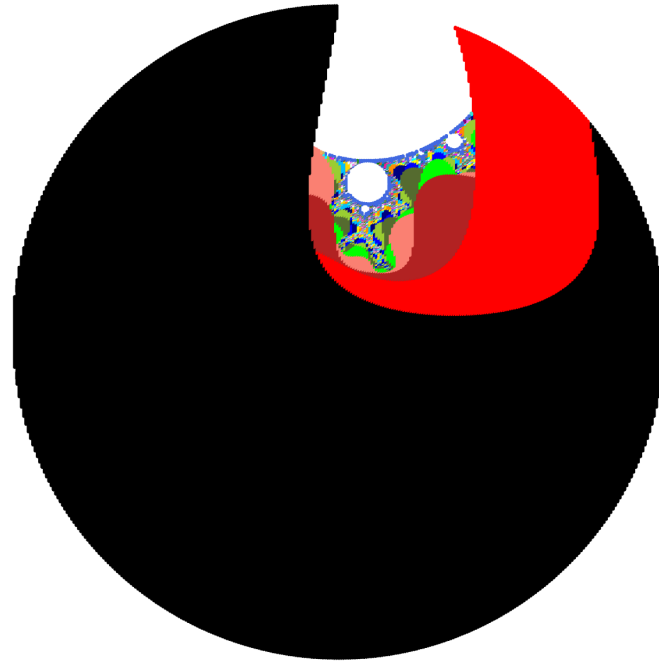


Ring-6 (N-15)

H-Position: 2.7 cm

X-Par: 12.85457117 cm

V-Height: 13.30457117

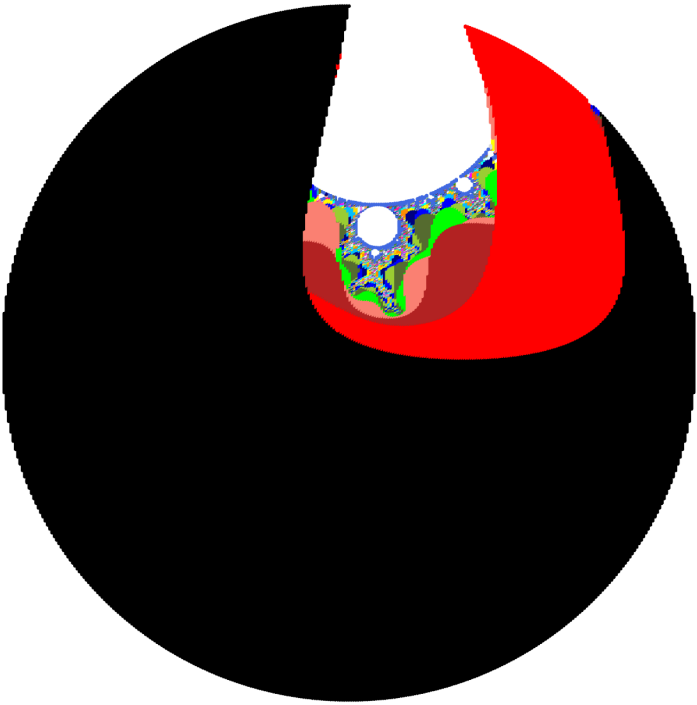


Ring-7 (N-14)

H-Position: 3.15 cm

X-Par: 13.67881574 cm

V-Height: 14.12881574

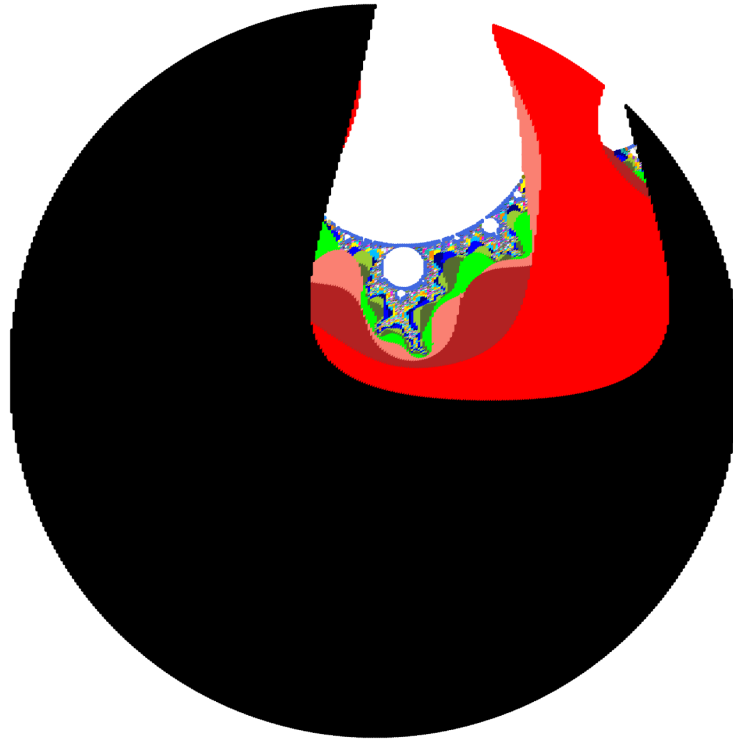


Ring-8 (N-13)

H-Position: 3.6 cm

X-Par: 14.4 cm

V-Height: 14.85 cm

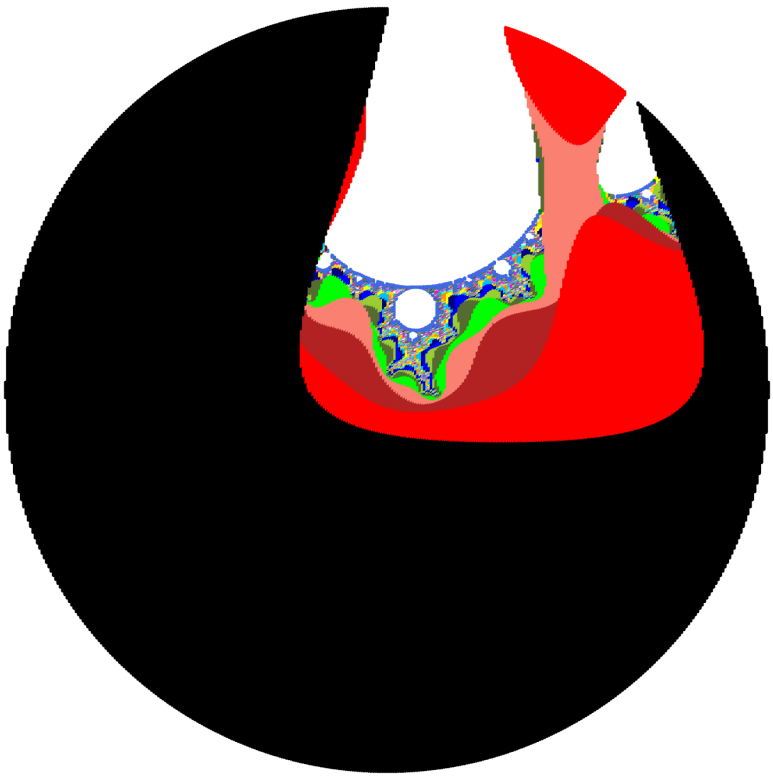


Ring-9 (N-12)

H-Position: 4.05 cm

X-Par: 15.03296378 cm

V-Height: 15.48296378

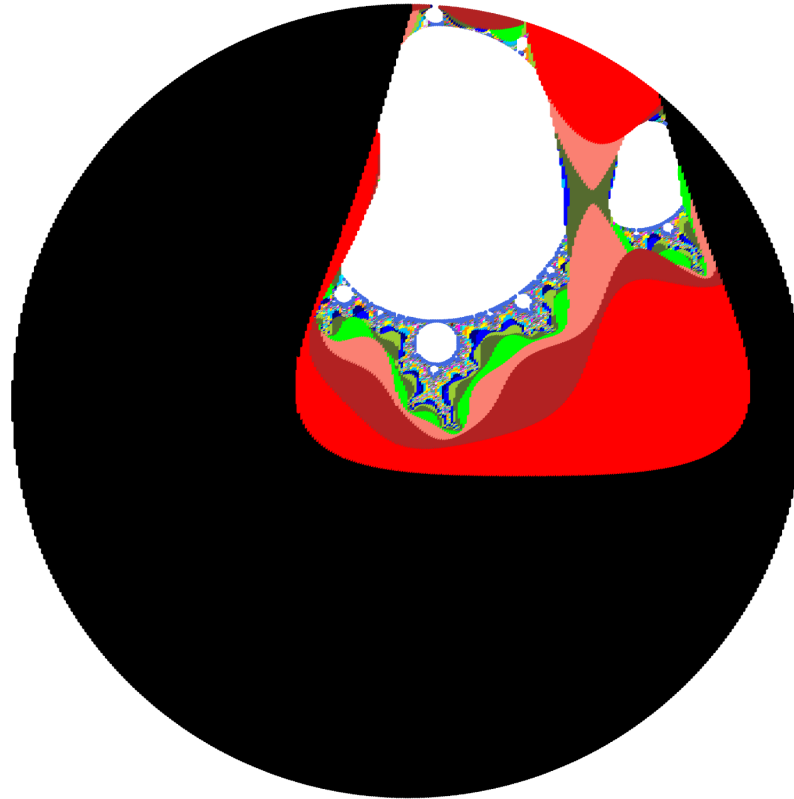


Ring-10 (N-11)

H-Position: 4.5 cm

X-Par: 15.58845727 cm

V-Height: 16.03845727

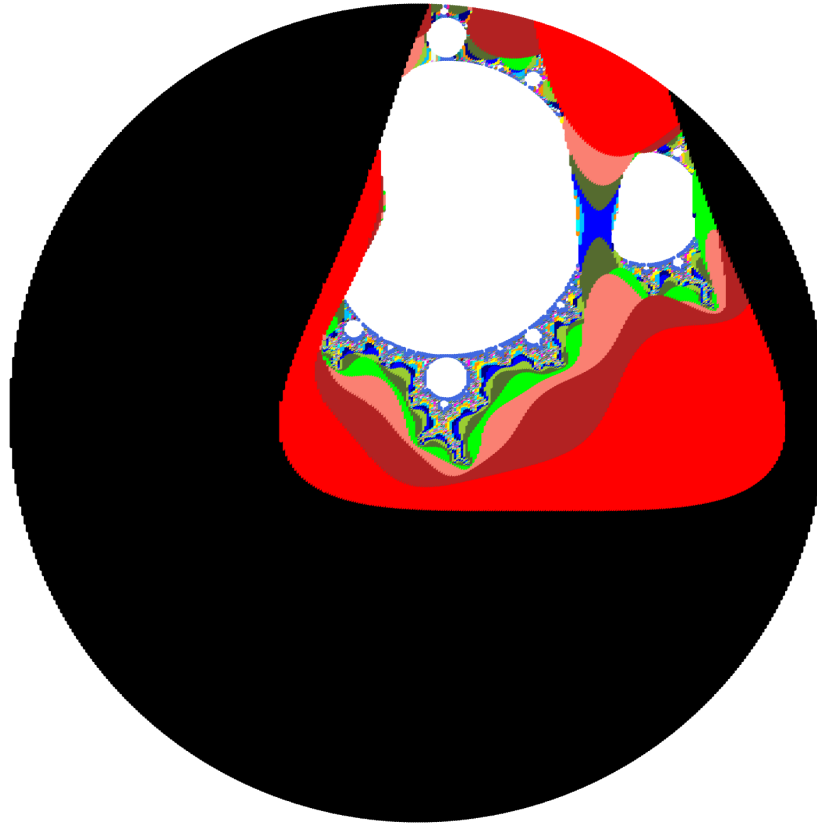


Ring-11 (N-10)

H-Position: 4.95 cm

X-Par: 16.07451399 cm

V-Height: 16.52451399

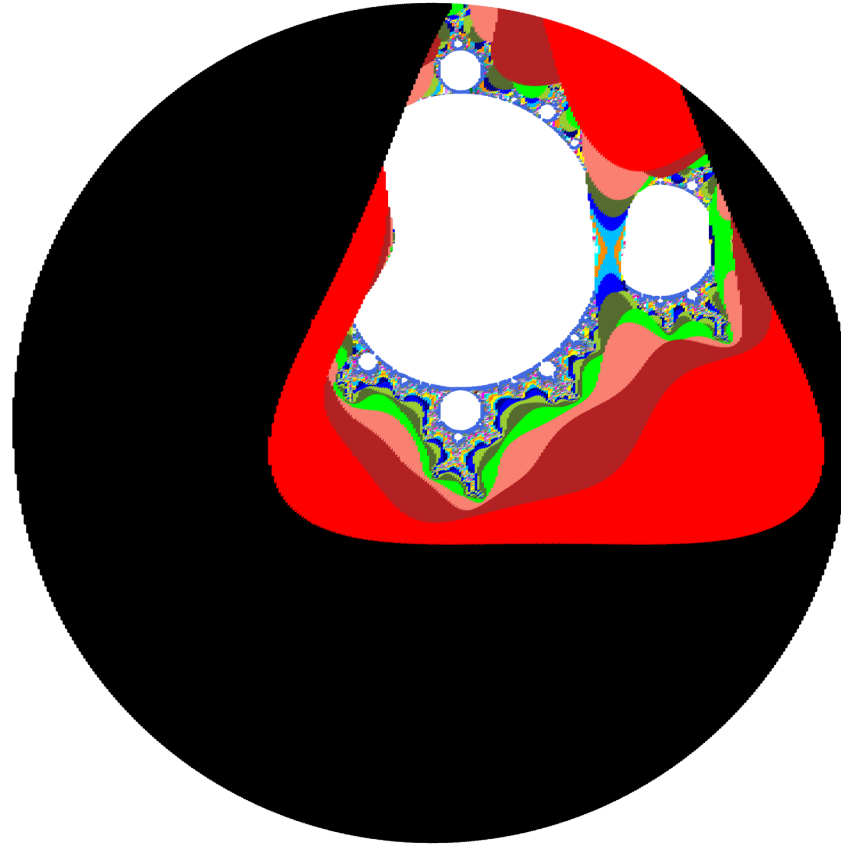


Ring-12 (N-9)

H-Position: 5.4 cm

X-Par: 16.4972725 cm

V-Height: 16.9472725 c

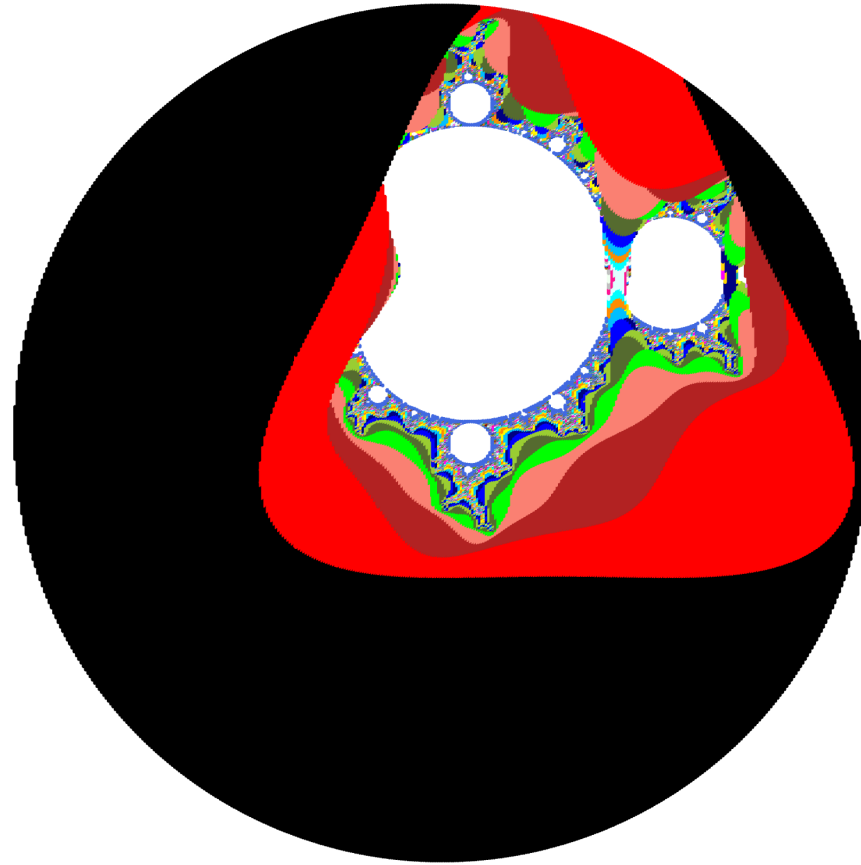


Ring-13 (N-8)

H-Position: 5.85 cm

X-Par: 16.8614946 cm

V-Height: 17.3114946 c

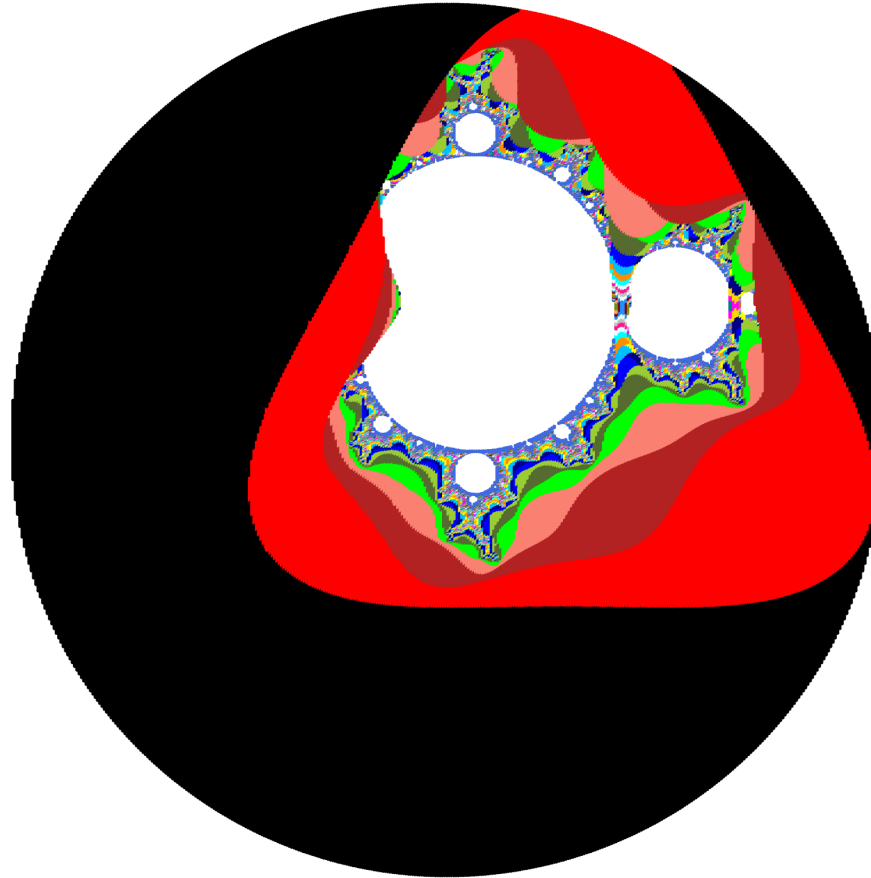


Ring-14 (N-7)

H-Position: 6.3 cm

X-Par: 17.17090563 cm

V-Height: 17.62090563

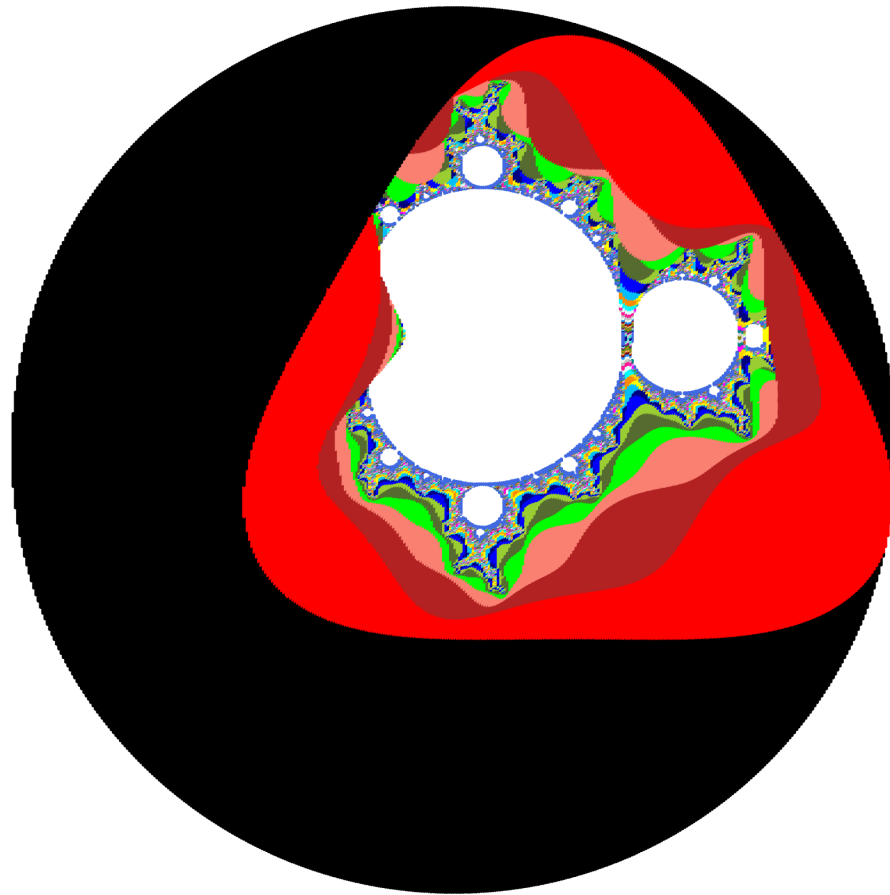


Ring-15 (N-6)

H-Position: 6.75 cm

X-Par: 17.42842506 cm

V-Height: 17.87842506

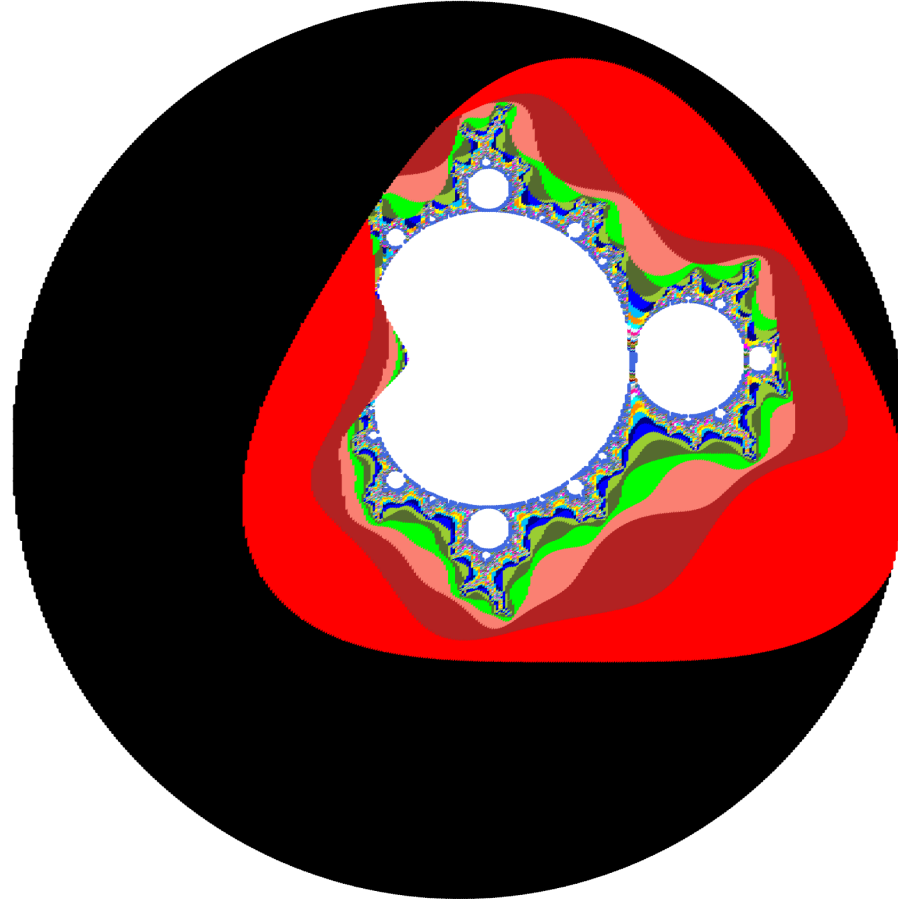


Ring-16 (N-5)

H-Position: 7.2 cm

X-Par: 17.63632615 cm

V-Height: 18.08632615

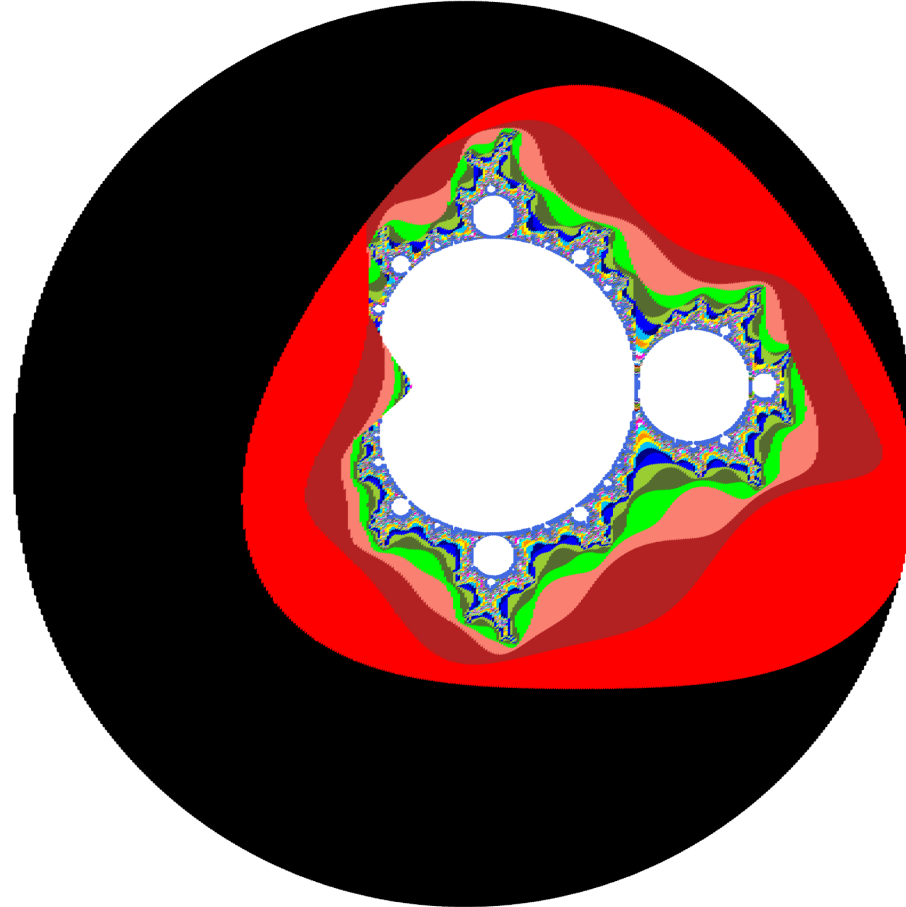


Ring-17 (N-4)

H-Position: 7.65 cm

X-Par: 17.79634794 cm

V-Height: 18.24634794

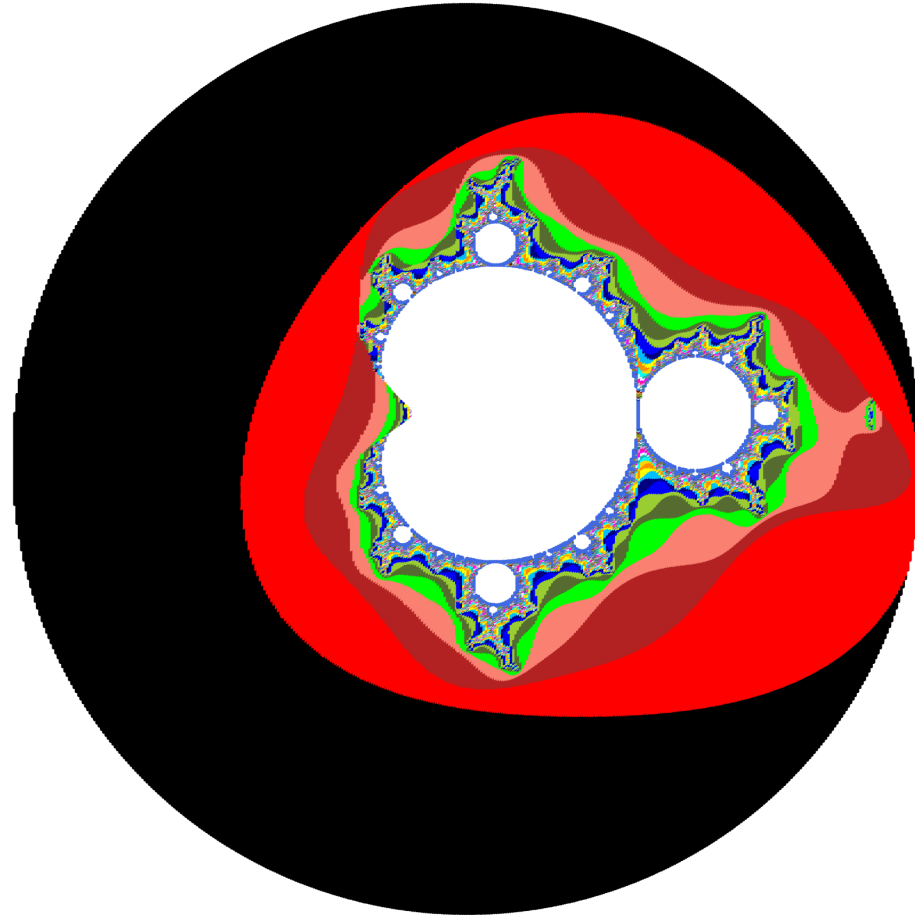


Ring-18 (N-3)

H-Position: 8.1 cm

X-Par: 17.90977387 cm

V-Height: 18.35977387

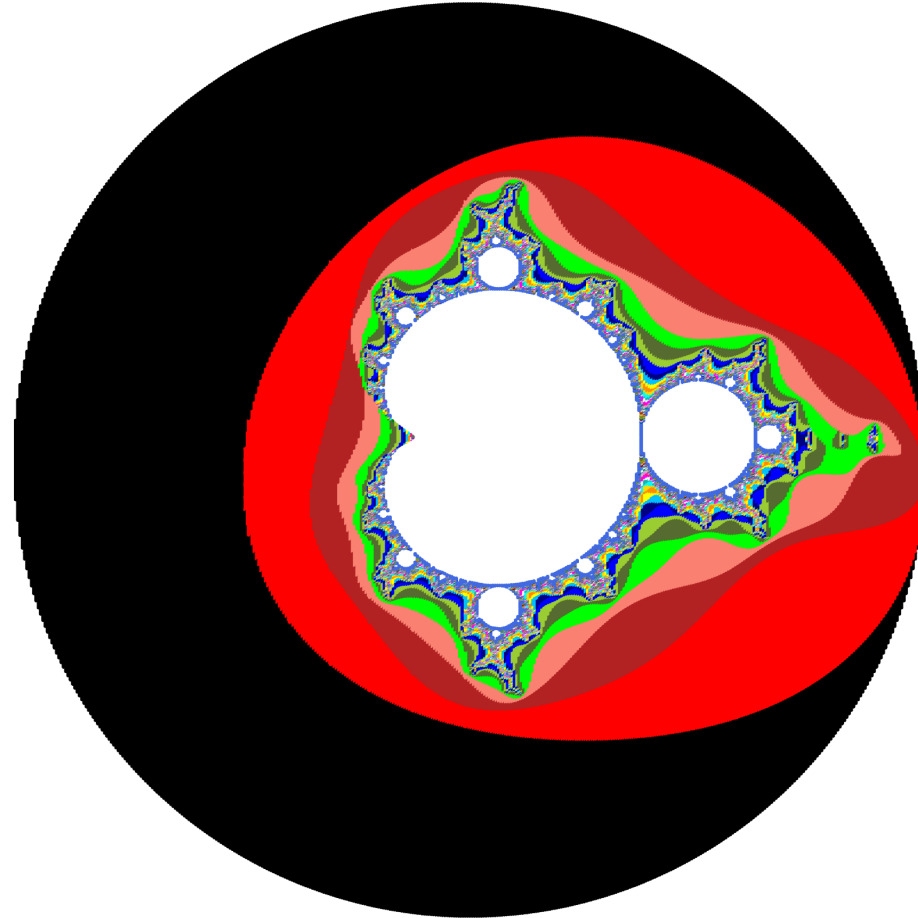


Ring-19 (N-2)

H-Position: 8.55 cm

X-Par: 17.97748592 cm

V-Height: 18.42748592

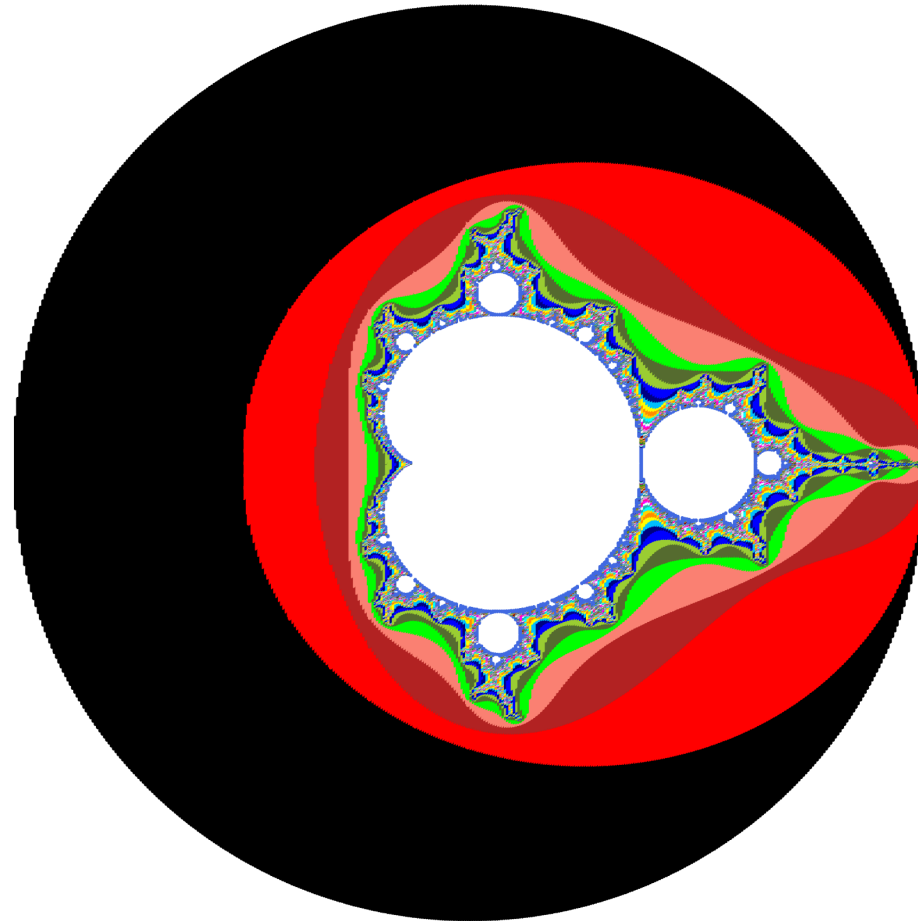


Ring-20 (P-1)

H-Position: 9.0 cm

X-Par: 18.0 cm

V-Height: 18.45 cm

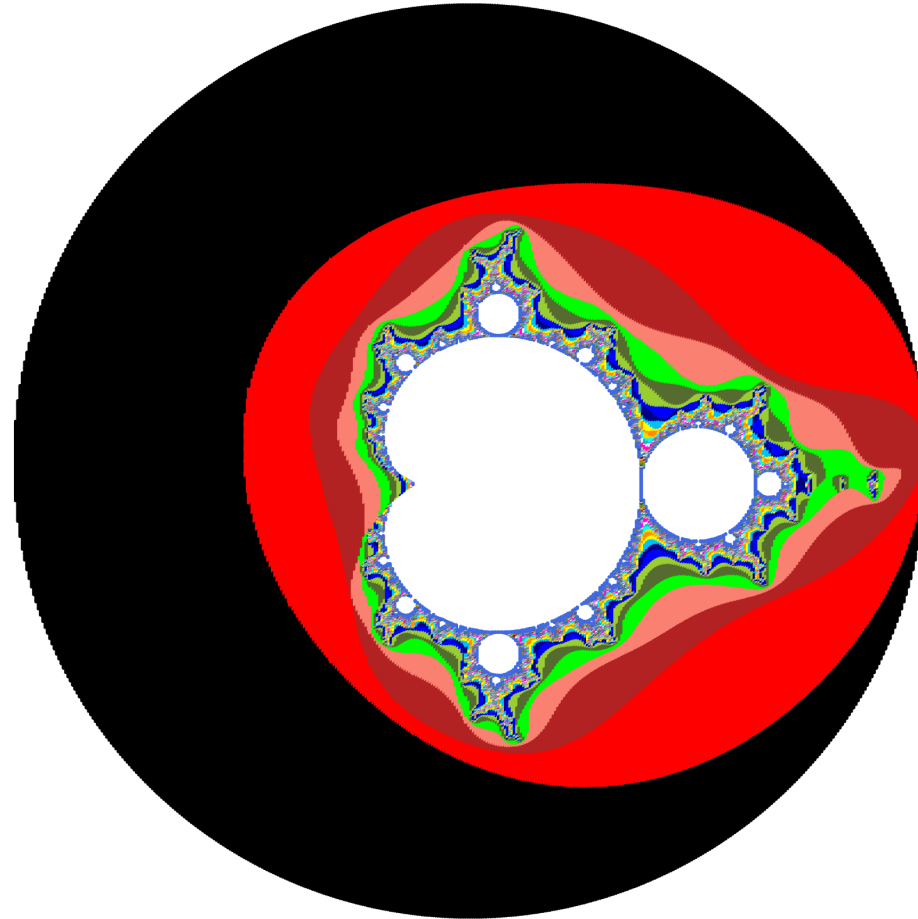


Ring-21 (P-2)

H-Position: 9.45 cm

X-Par: 17.97748592 cm

V-Height: 18.42748592 cm

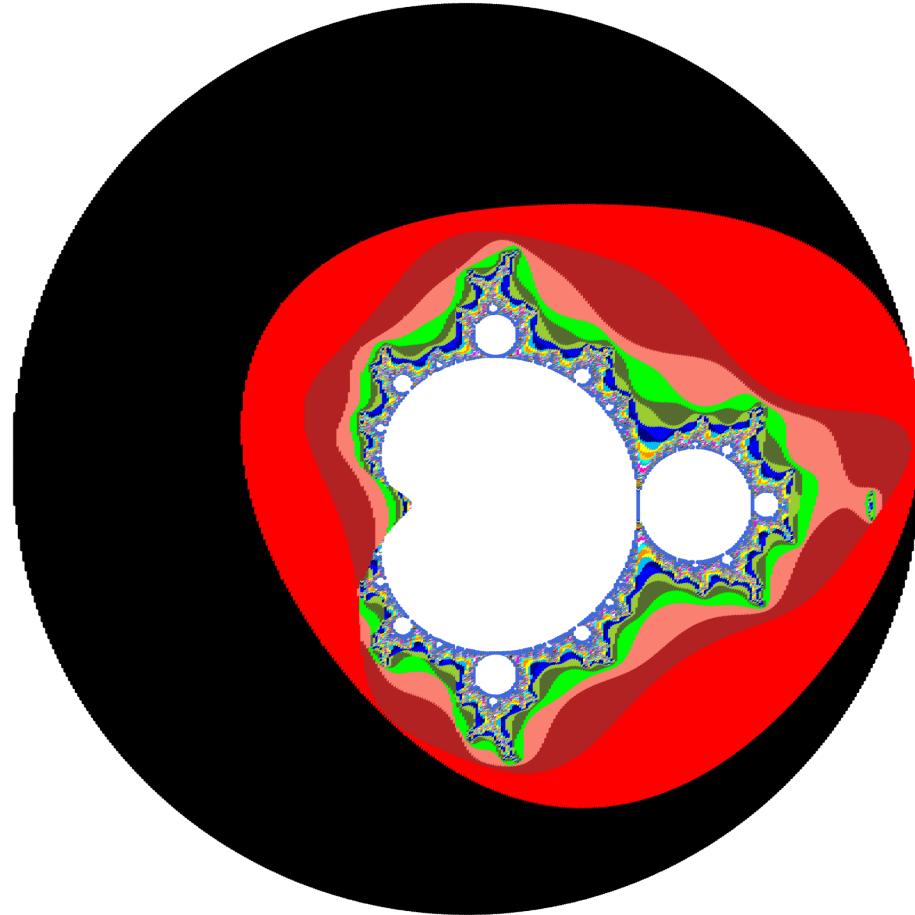


Ring-22 (P-3)

H-Position: 9.9 cm

X-Par: 17.90977387 cm

V-Height: 18.35977387 cm

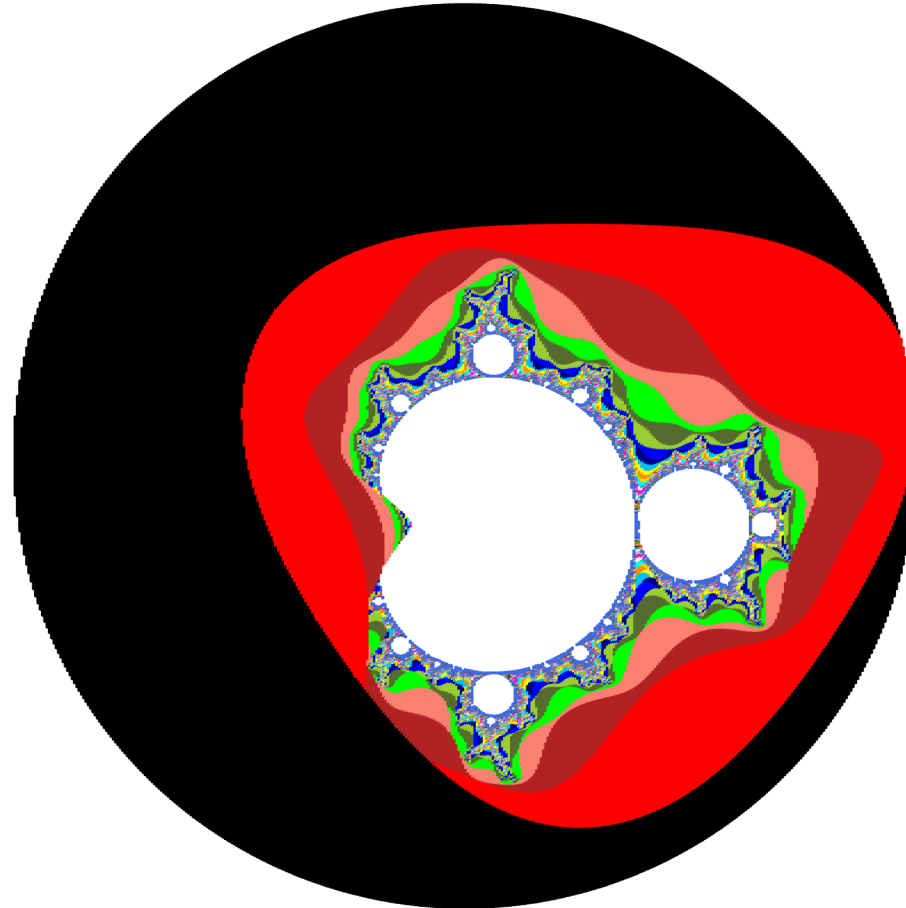


Ring-23 (P-4)

H-Position: 10.35 cm

X-Par: 17.79634794 cm

V-Height: 18.24634794 cm

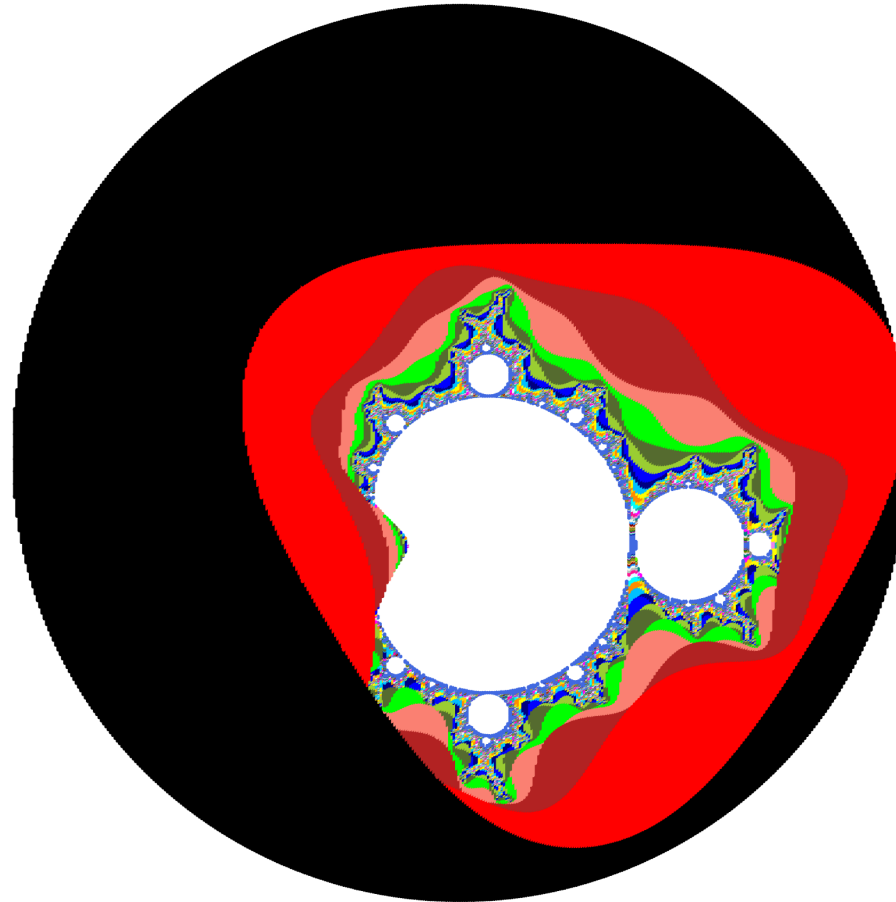


Ring-24 (P-5)

H-Position: 10.8 cm

X-Par: 17.63632615 cm

V-Height: 18.08632615 cm

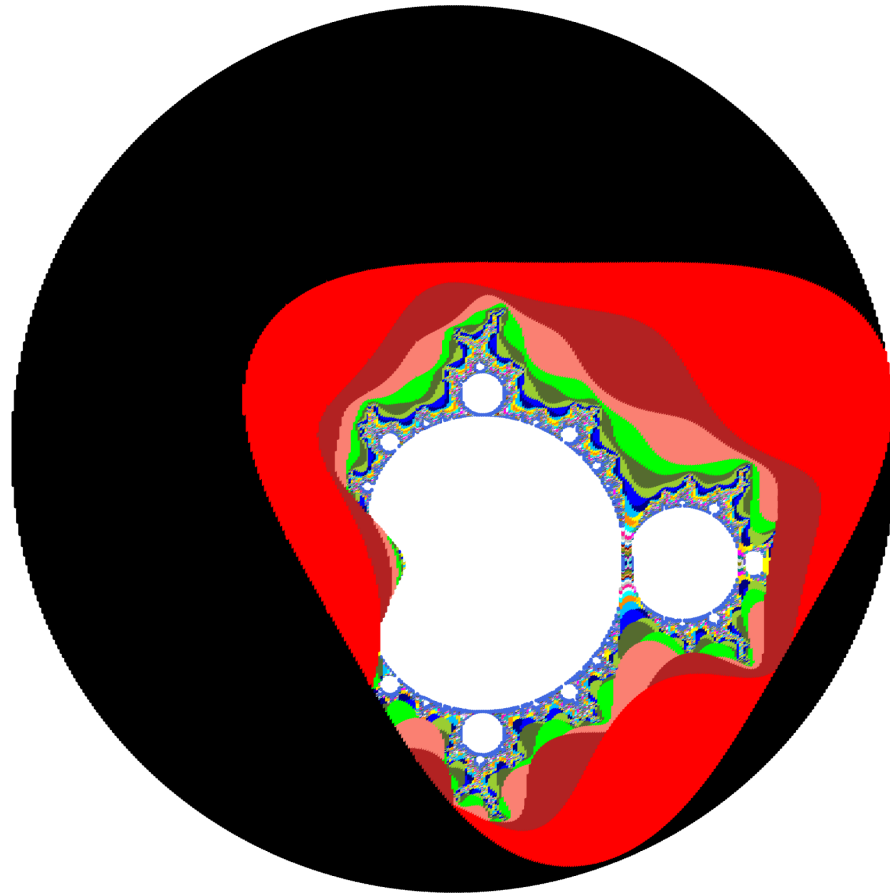


Ring-25 (P-6)

H-Position: 11.25 cm

X-Par: 17.42842506 cm

V-Height: 17.87842506 cm

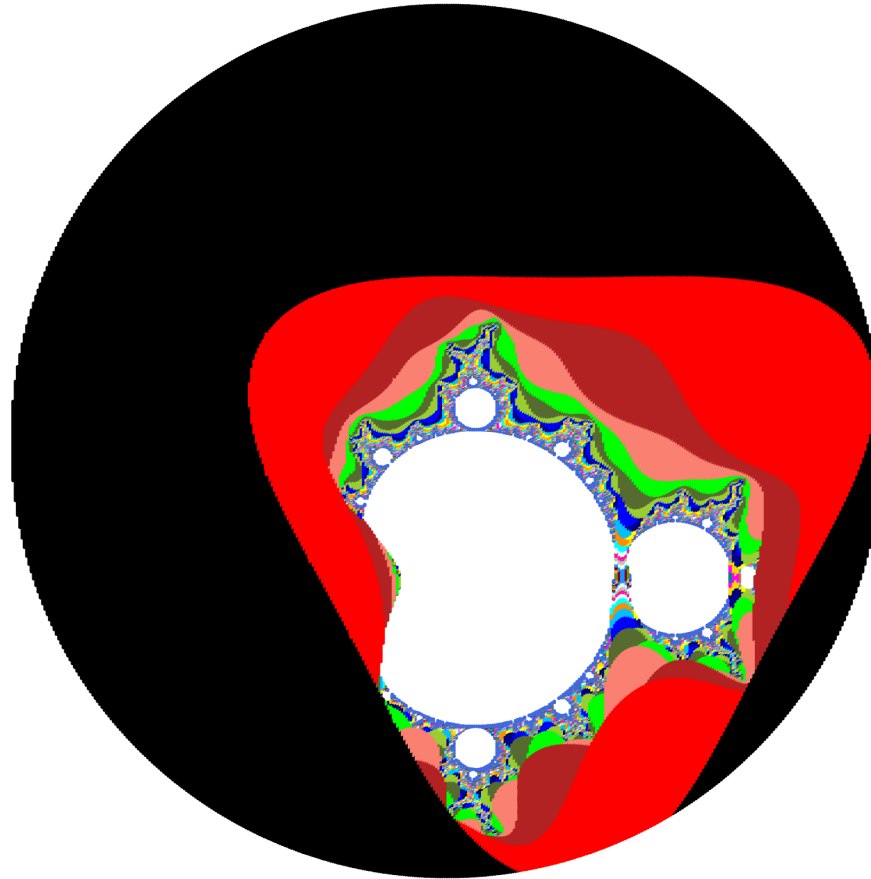


Ring-26 (P-7)

H-Position: 11.7 cm

X-Par: 17.17090563 cm

V-Height: 17.62090563 cm

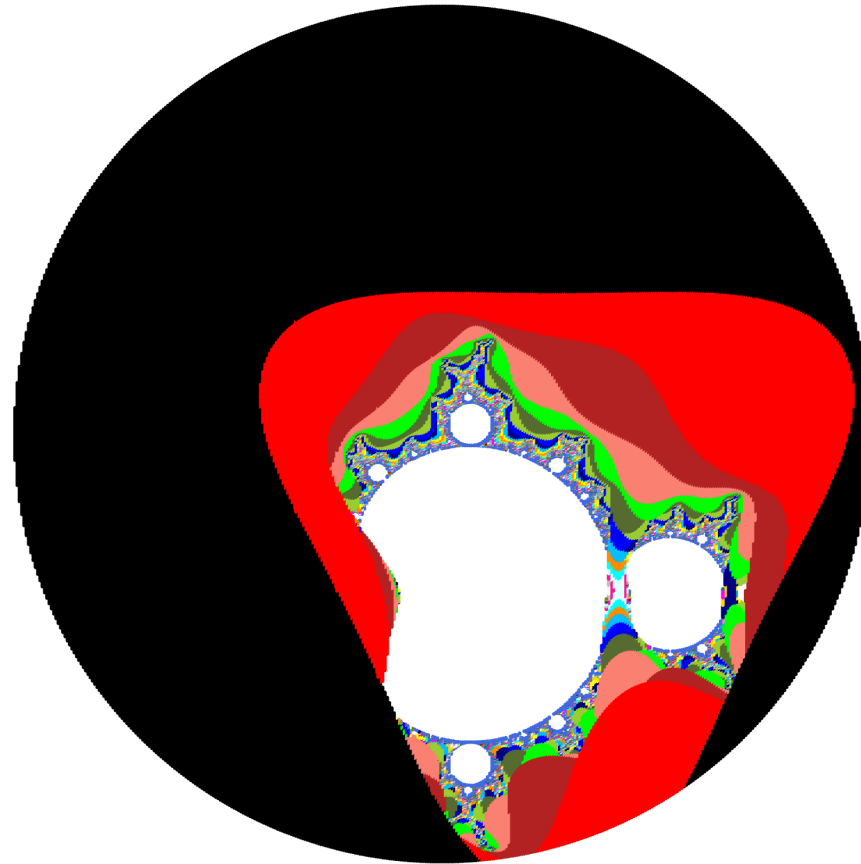


Ring-27 (P-8)

H-Position: 12.15 cm

X-Par: 16.8614946 cm

V-Height: 17.3114946 cm

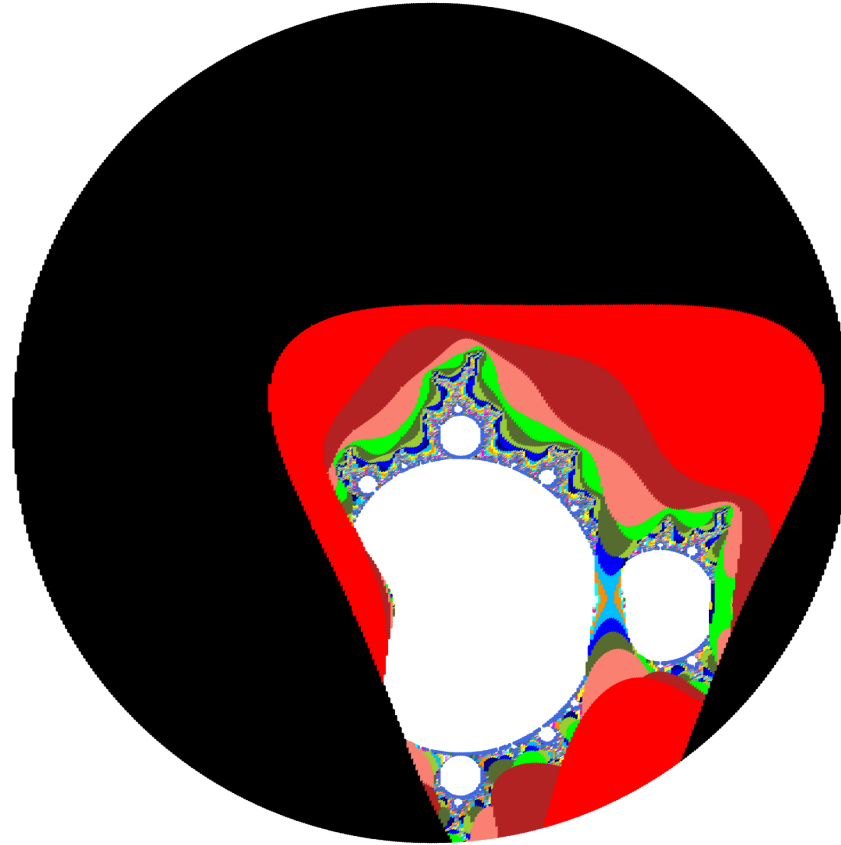


Ring-28 (P-9)

H-Position: 12.6 cm

X-Par: 16.4972725 cm

V-Height: 16.9472725 cm

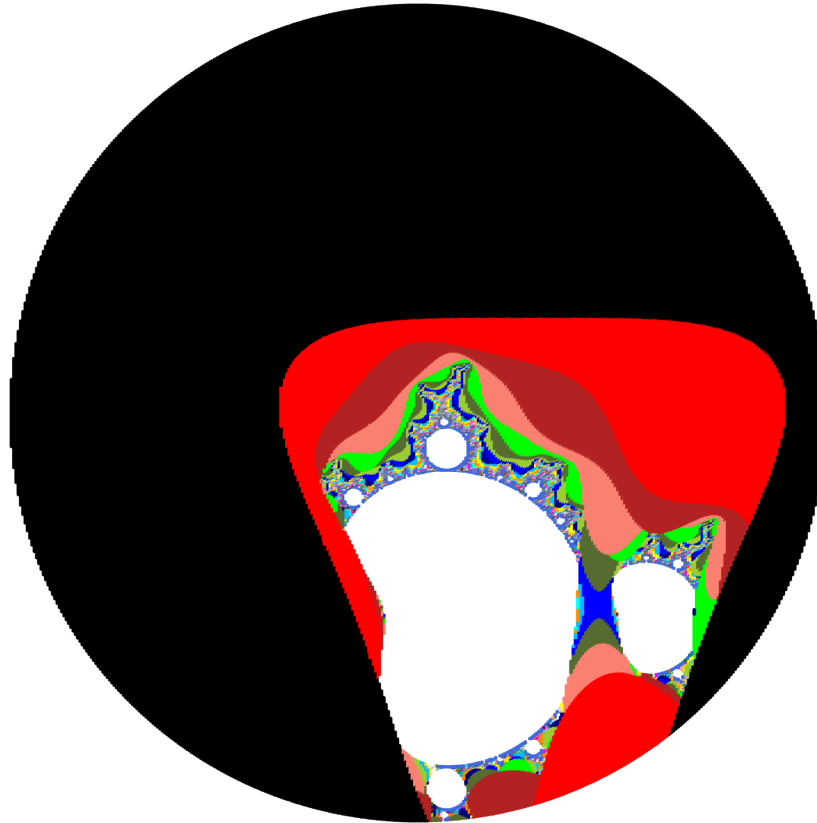


Ring-29 (P-10)

H-Position: 13.05 cm

X-Par: 16.07451399 cm

V-Height: 16.52451399 cm

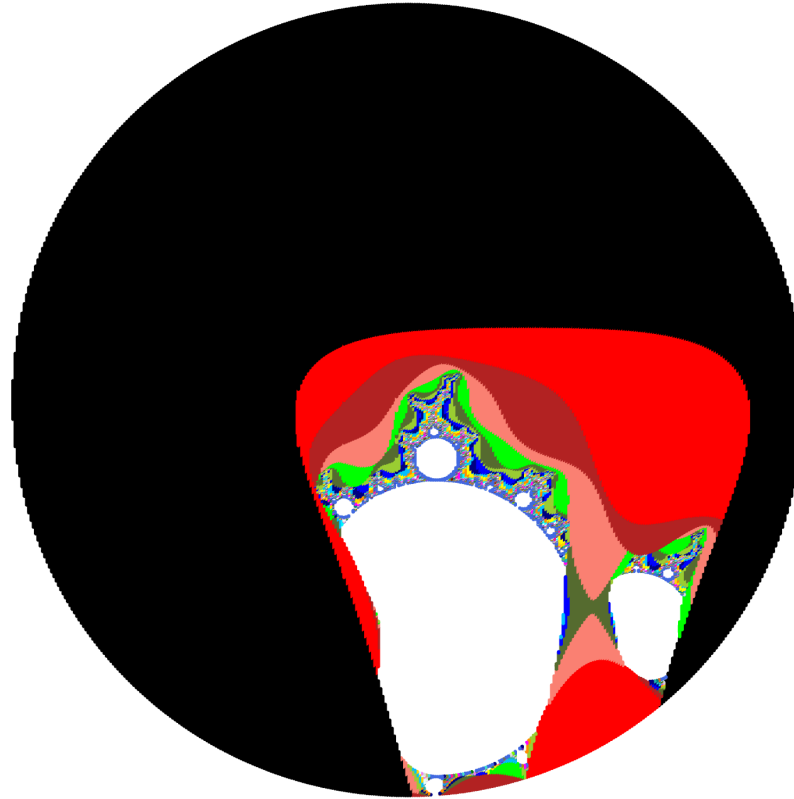


Ring-30 (P-11)

H-Position: 13.5 cm

X-Par: 15.58845727 cm

V-Height: 16.03845727 cm

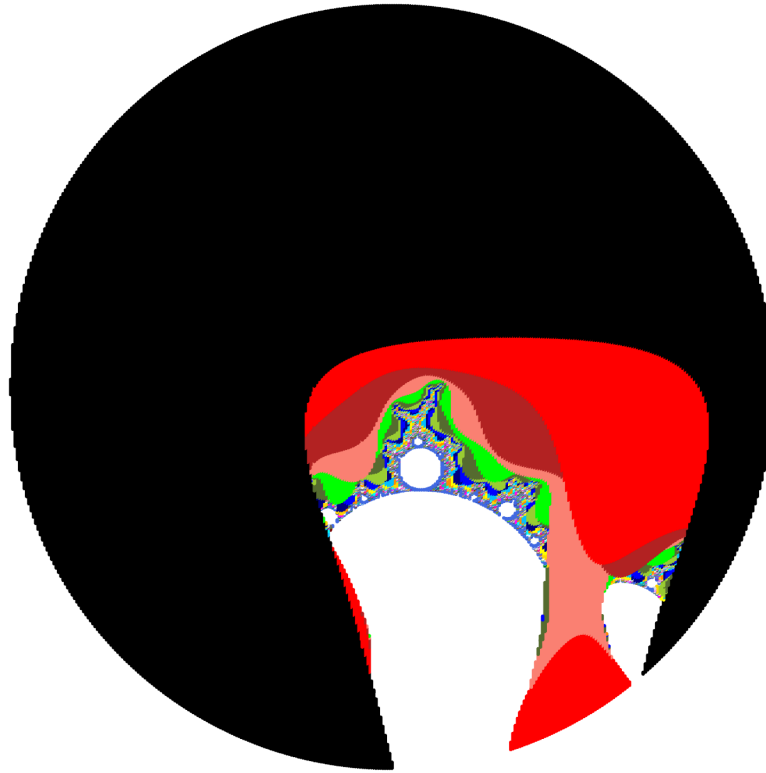


Ring-31 (P-12)

H-Position: 13.95 cm

X-Par: 15.03296378 cm

V-Height: 15.48296378 cm

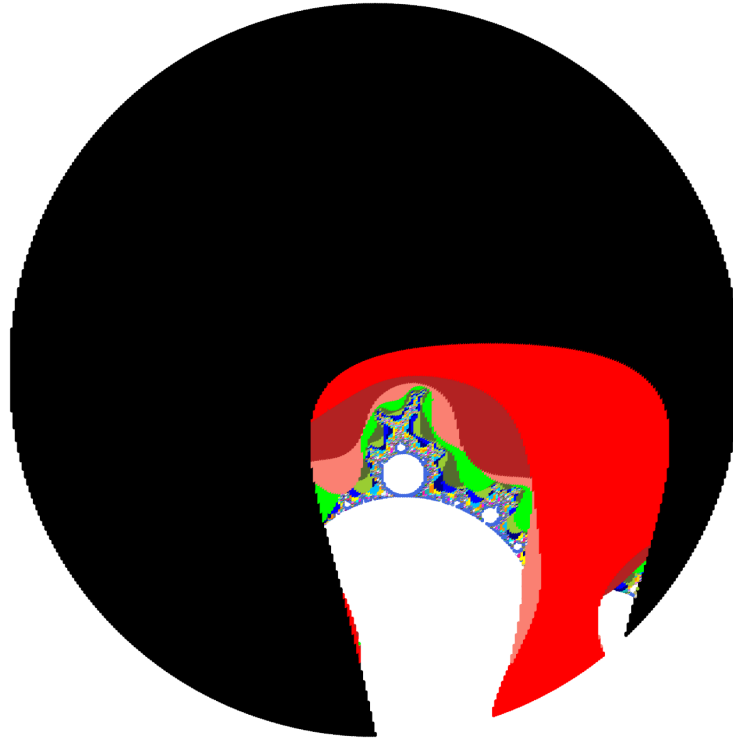


Ring-32 (P-13)

H-Position: 14.4 cm

X-Par: 14.4 cm

V-Height: 14.85 cm

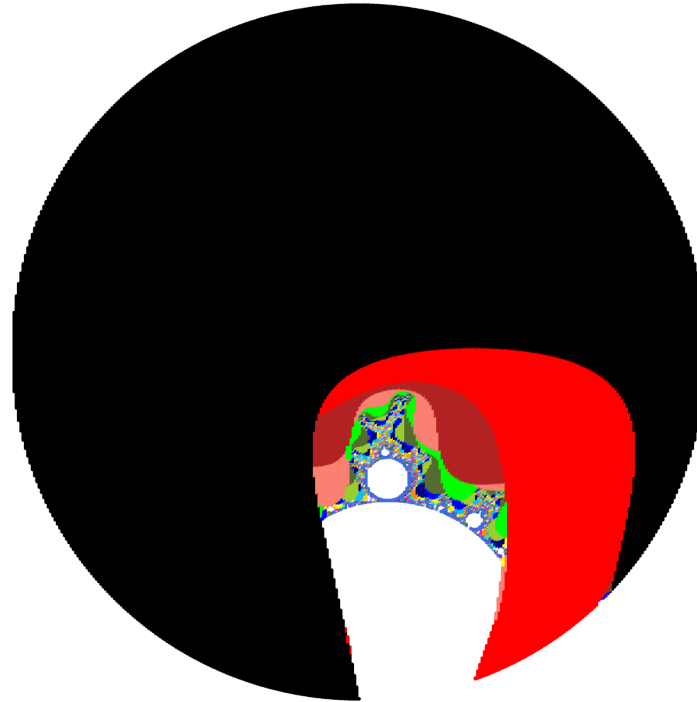


Ring-33 (P-14)

H-Position: 14.85 cm

X-Par: 13.67881574 cm

V-Height: 14.12881574 cm

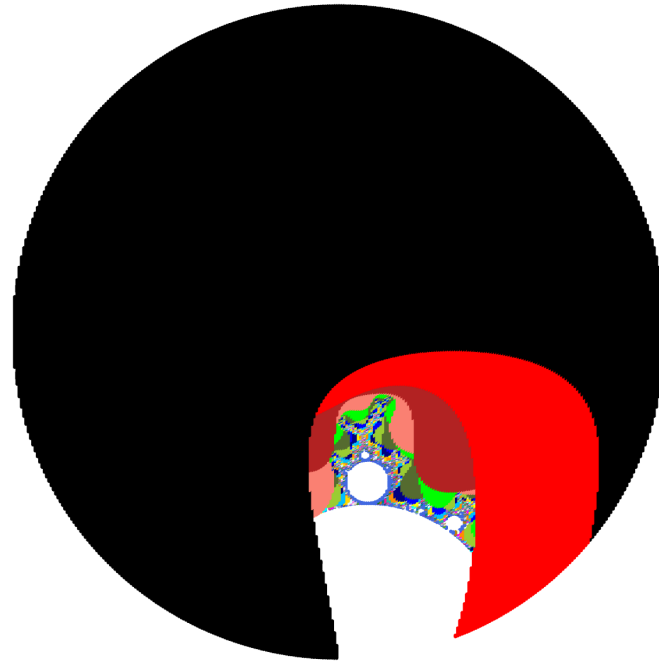


Ring-34 (P-15)

H-Position: 15.3 cm

X-Par: 12.85457117 cm

V-Height: 13.30457117 cm



Ring-35 (P-16)

H-Position: 15.75 cm

X-Par: 11.9058809 cm

V-Height: 12.3558809 cm

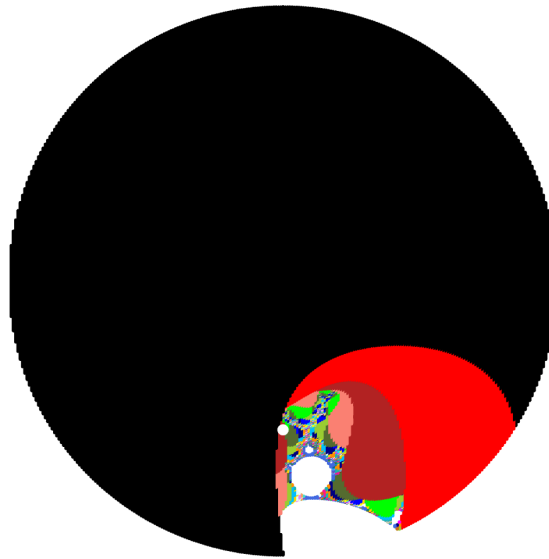


Ring-36 (P-17)

H-Position: 16.2 cm

X-Par: 10.8 cm

V-Height: 11.25 cm

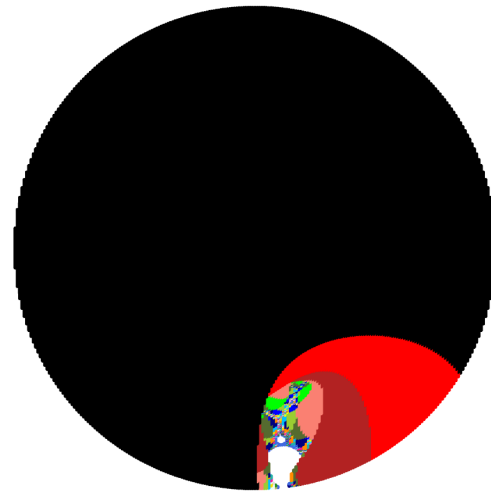


Ring-37 (P-18)

H-Position: 16.65 cm

X-Par: 9.482088378 cm

V-Height: 9.932088378 cm

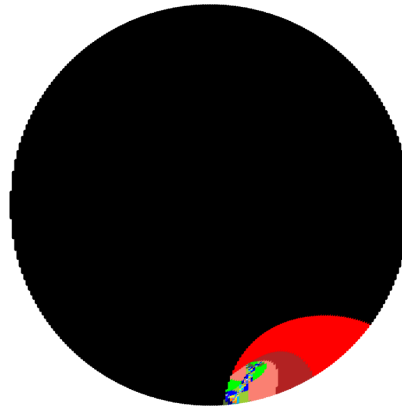


Ring-38 (P-19)

H-Position: 17.1 cm

X-Par: 7.846018098 cm

V-Height: 8.296018098 cm

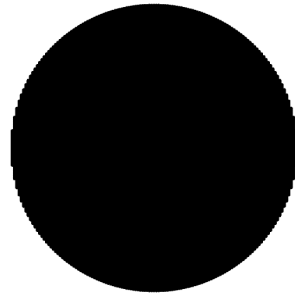


Ring-39 (P-20)

H-Position: 17.55 cm

X-Par: 5.620498199 cm

V-Height: 6.070498199 cm



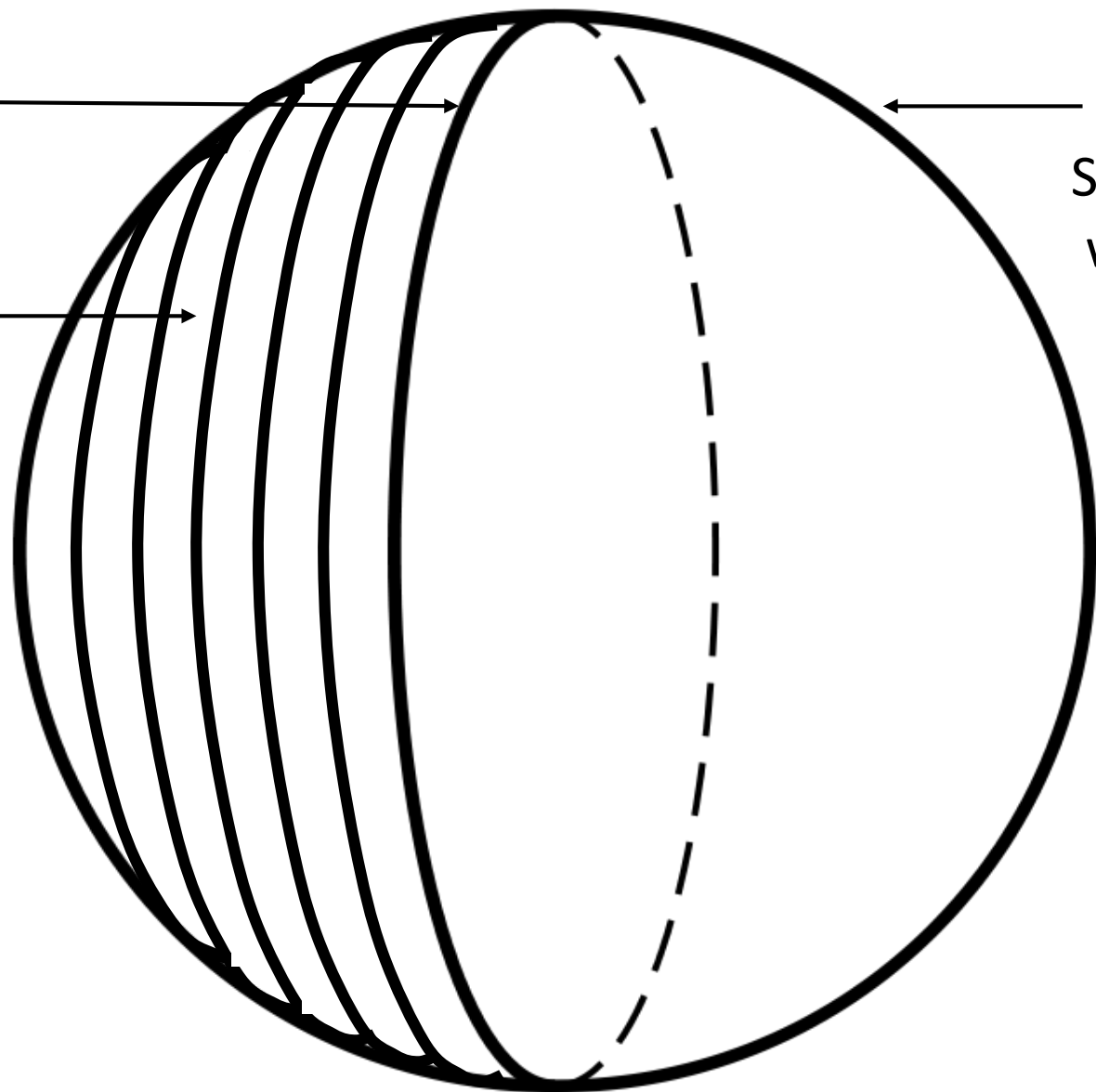
Center Ring

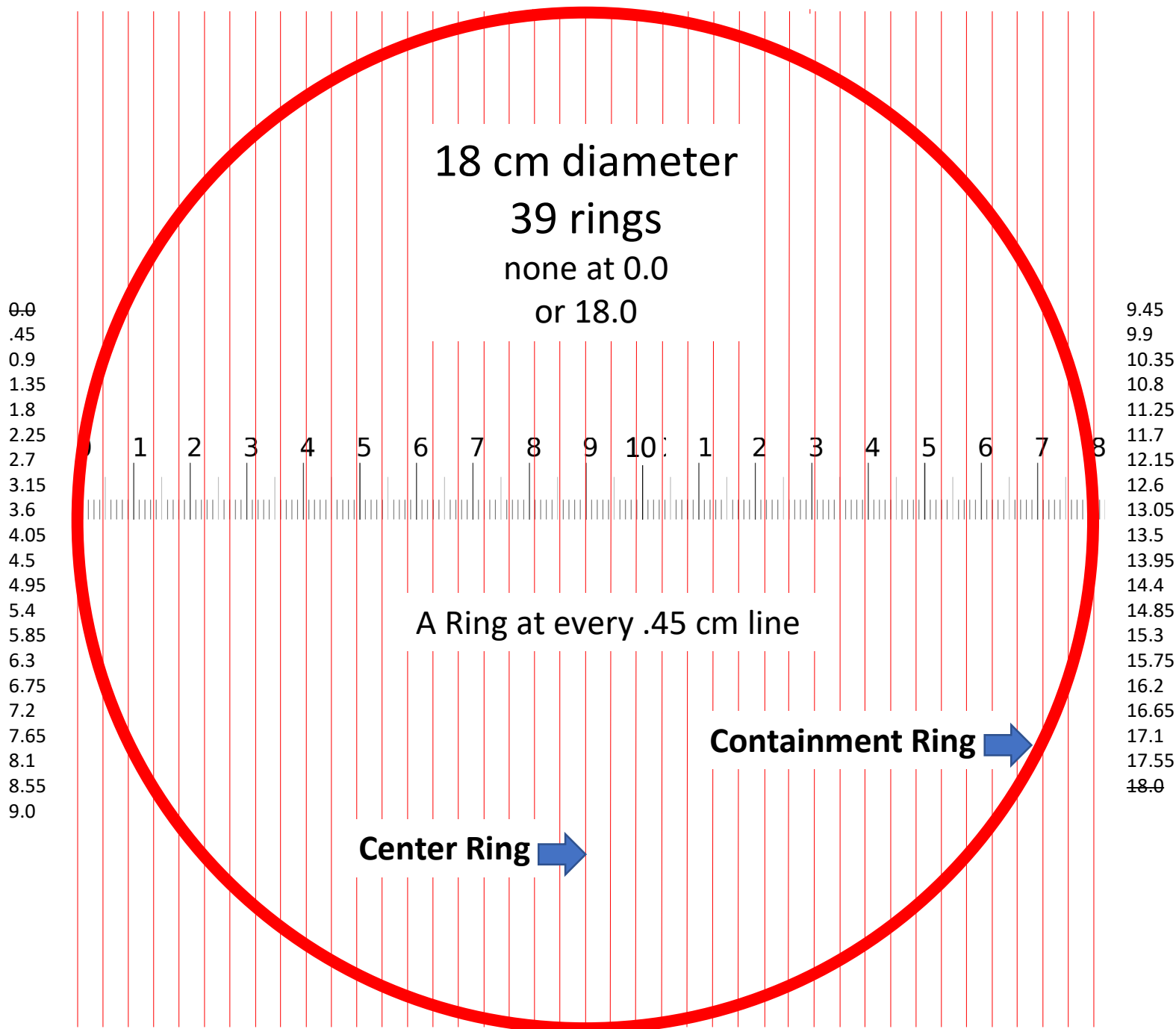
Containment Ring

Supports 39 Rings in-place
with notches (19 on each
Side of Center Ring)

Rings

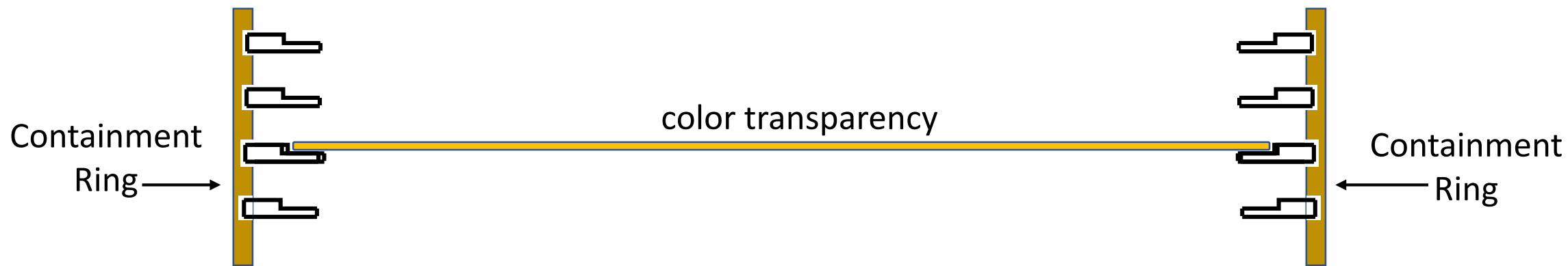
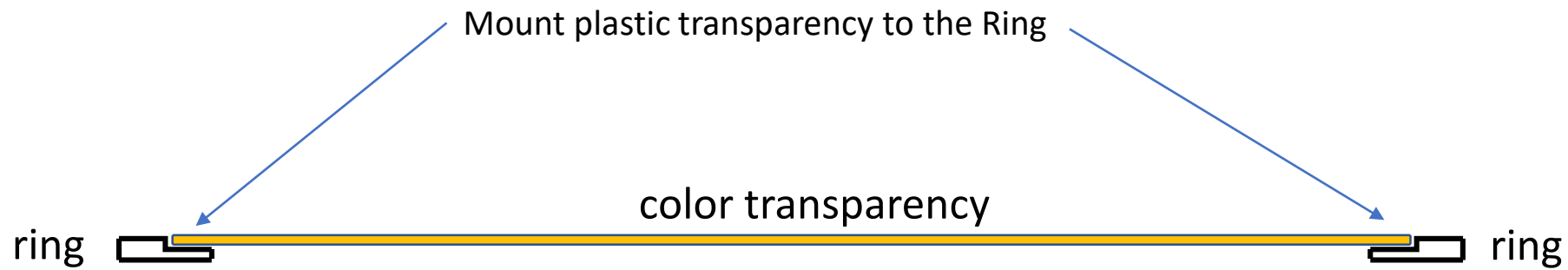
(19 on each side)





Transparency Size

5.620498	17.97749
7.846018	17.90977
9.482088	17.79635
10.8	17.63633
11.90588	17.42843
12.85457	17.17091
13.67882	16.86149
14.4	16.49727
15.03296	16.07451
15.58846	15.58846
16.07451	15.03296
16.49727	14.4
16.86149	13.67882
17.17091	12.85457
17.42843	11.90588
17.63633	10.8
17.79635	9.482088
17.90977	7.846018
17.97749	5.620498
18	



- **With regards to the entire design process, have these rings already been designed and ready to print, or is that also one of the requirements?** No CAD has been done.

- **If I am required to design these using CAD, how thick does the containment ring need to be?** The Containment Ring has an extra job to do -- support 39 other Rings all at once -- so by definition it must be thicker and MORE stable. Plus, the Containment Ring has notches for the 39 rings (top and bottom) so it needs to be stronger PLUS there is no requirement for it to be thin. The Containment Ring has room to grow -- both thickness and width -- it is a 'background' support item -- PLUS it could be clear and transparent

- **How thick do the 40 inner rings need to be?**
Thickness of the rings is a function of "how thin can they be?" They 39 rings need to be thin - just because of the .45 cm separation over 18 cm. But cannot be so thin that they skew and break -- hence the 39 Rings must be "as thin as possible" but remain stable. (the indentation around the entire ring -- which is where the color transparencies attach -- will add thickness automatically) NOTE: the maximum thickness is when the rings begin to touch one-another.

- **Is there any particular colour requirement?** No. But ideally -- clear transparent Rings and Containment Ring would be ideal. If that is not possible then black Rings is great -- works okay for CR also. (Black Rings and Clear Containment Ring would look real good)

- **What is the application for this project?**

Mathematics DEMO object -- to be displayed in classroom and/or be the object of a Video for Mathematics Education. The purpose of the sequential color transparencies is to show the mutation in color and shapes --- going from one end of the sphere to the other. It is UNLIKELY -- but POSSIBLE that more than one will be needed. In that case we will have to go back into negotiations.

- **Will this be on display and exposed to the elements?** Indoor only with no elements, no temperature issues, and no physical stress applied to the completed item

- **Have you taken into consideration how the colour transparencies will mount to the rings?** Not really -- other than dabs of a clear glue-like fastener. Thought about an inner fastener ring that snaps into the outer Ring -- but it may be too complicated.

RING #	H-Position cm	V-Length cm (size of Color Transparency)	V-Length PLUS 0.45
1	0.45	5.620498199	6.070498199
2	0.9	7.846018098	8.296018098
3	1.35	9.482088378	9.932088378
4	1.8	10.8	11.25
5	2.25	11.9058809	12.3558809
6	2.7	12.85457117	13.30457117
7	3.15	13.67881574	14.12881574
8	3.6	14.4	14.85
9	4.05	15.03296378	15.48296378
10	4.5	15.58845727	16.03845727
11	4.95	16.07451399	16.52451399
12	5.4	16.4972725	16.9472725
13	5.85	16.8614946	17.3114946
14	6.3	17.17090563	17.62090563
15	6.75	17.42842506	17.87842506
16	7.2	17.63632615	18.08632615
17	7.65	17.79634794	18.24634794
18	8.1	17.90977387	18.35977387
19	8.55	17.97748592	18.42748592
20	9	18	18.45
21	9.45	17.97748592	18.42748592
22	9.9	17.90977387	18.35977387
23	10.35	17.79634794	18.24634794
24	10.8	17.63632615	18.08632615
25	11.25	17.42842506	17.87842506
26	11.7	17.17090563	17.62090563
27	12.15	16.8614946	17.3114946
28	12.6	16.4972725	16.9472725
29	13.05	16.07451399	16.52451399
30	13.5	15.58845727	16.03845727
31	13.95	15.03296378	15.48296378
32	14.4	14.4	14.85
33	14.85	13.67881574	14.12881574
34	15.3	12.85457117	13.30457117
35	15.75	11.9058809	12.3558809
36	16.2	10.8	11.25
37	16.65	9.482088378	9.932088378
38	17.1	7.846018098	8.296018098
39	17.55	5.620498199	6.070498199

RING #	H-Position cm	V-Length cm (size of Color Transparency)	V-Length PLUS 0.45
1	0.45	5.620498199	6.070498199
2	0.9	7.846018098	8.296018098
3	1.35	9.482088378	9.932088378
4	1.8	10.8	11.25
5	2.25	11.9058809	12.3558809
6	2.7	12.85457117	13.30457117
7	3.15	13.67881574	14.12881574
8	3.6	14.4	14.85
9	4.05	15.03296378	15.48296378
10	4.5	15.58845727	16.03845727
11	4.95	16.07451399	16.52451399
12	5.4	16.4972725	16.9472725
13	5.85	16.8614946	17.3114946
14	6.3	17.17090563	17.62090563
15	6.75	17.42842506	17.87842506
16	7.2	17.63632615	18.08632615
17	7.65	17.79634794	18.24634794
18	8.1	17.90977387	18.35977387
19	8.55	17.97748592	18.42748592
20	9	18	18.45

RING #	H-Position cm	V-Length cm (size of Color Transparency)	V-Length PLUS 0.45
20	9	18	18.45
21	9.45	17.97748592	18.42748592
22	9.9	17.90977387	18.35977387
23	10.35	17.79634794	18.24634794
24	10.8	17.63632615	18.08632615
25	11.25	17.42842506	17.87842506
26	11.7	17.17090563	17.62090563
27	12.15	16.8614946	17.3114946
28	12.6	16.4972725	16.9472725
29	13.05	16.07451399	16.52451399
30	13.5	15.58845727	16.03845727
31	13.95	15.03296378	15.48296378
32	14.4	14.4	14.85
33	14.85	13.67881574	14.12881574
34	15.3	12.85457117	13.30457117
35	15.75	11.9058809	12.3558809
36	16.2	10.8	11.25
37	16.65	9.482088378	9.932088378
38	17.1	7.846018098	8.296018098
39	17.55	5.620498199	6.070498199

