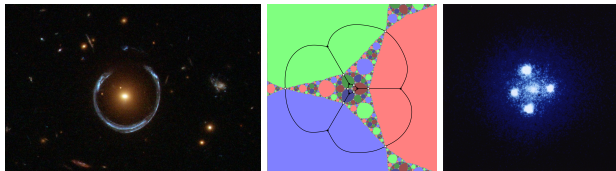


Classification of Critically Fixed Anti-Thurston Maps

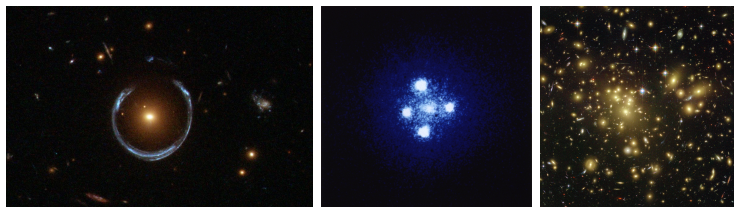
Lukas Geyer

Montana State University
Bozeman, MT



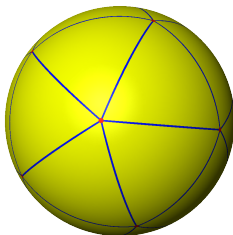
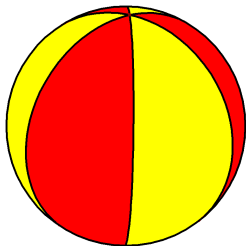
COMD Research Seminar, MSRI, May 17, 2022

Gravitational Lenses



Hubble Space Telescope pictures of gravitational lenses

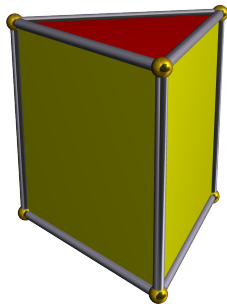
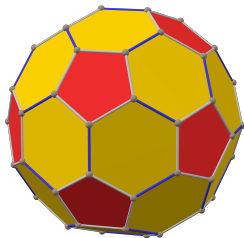
Critically Fixed Anti-Rational Maps: Beach Ball and Icosahedron



Credit: *Wikipedia*

- Map each face anti-conformally to its complement, fixing vertices.
- Gives anti-rational maps of degree $\#faces - 1$. The vertices are fixed critical points.

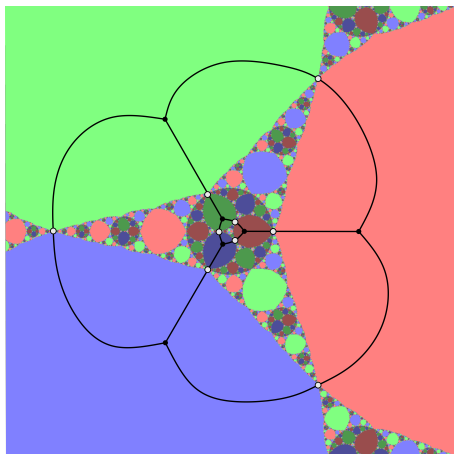
Critically Fixed Anti-Rational Maps: Football and Prism



Credit: *Wikipedia*

- Anti-conformal maps from faces to complements do not match on the edges, resulting functions are not continuous.
- What to do?
- Introduce flexibility, use (anti-)Thurston maps

Critically Fixed Anti-Rational Map: Prism



Credit: *Chris McKay*

Critically fixed anti-rational map for the prism, with the 1-skeleton of the prism realized as the “Tischler graph”. Explicitly,

$$f(z) = \frac{a\bar{z}^2}{\bar{z}^3 + 1} + \frac{b}{\bar{z}},$$

$a \approx 2.35$, $b \approx 0.0135$.