Hyperbolic surfaces as singular flat surfaces

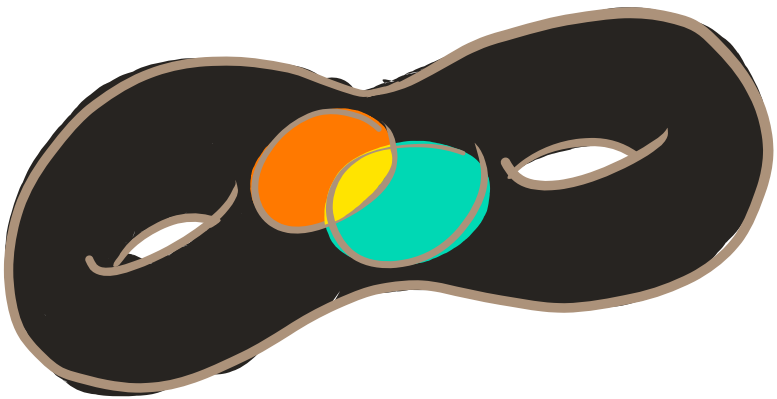
Aaron Fenyes (University of Toronto)

UMD geometry–topology seminar, February 2018

Hyperbolic surface

Modeled on hyperbolic plane,
with isometries as symmetries.

Has uniform negative curvature.



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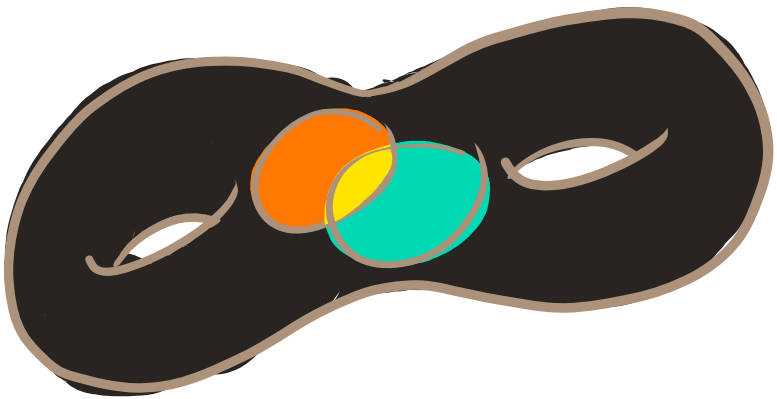

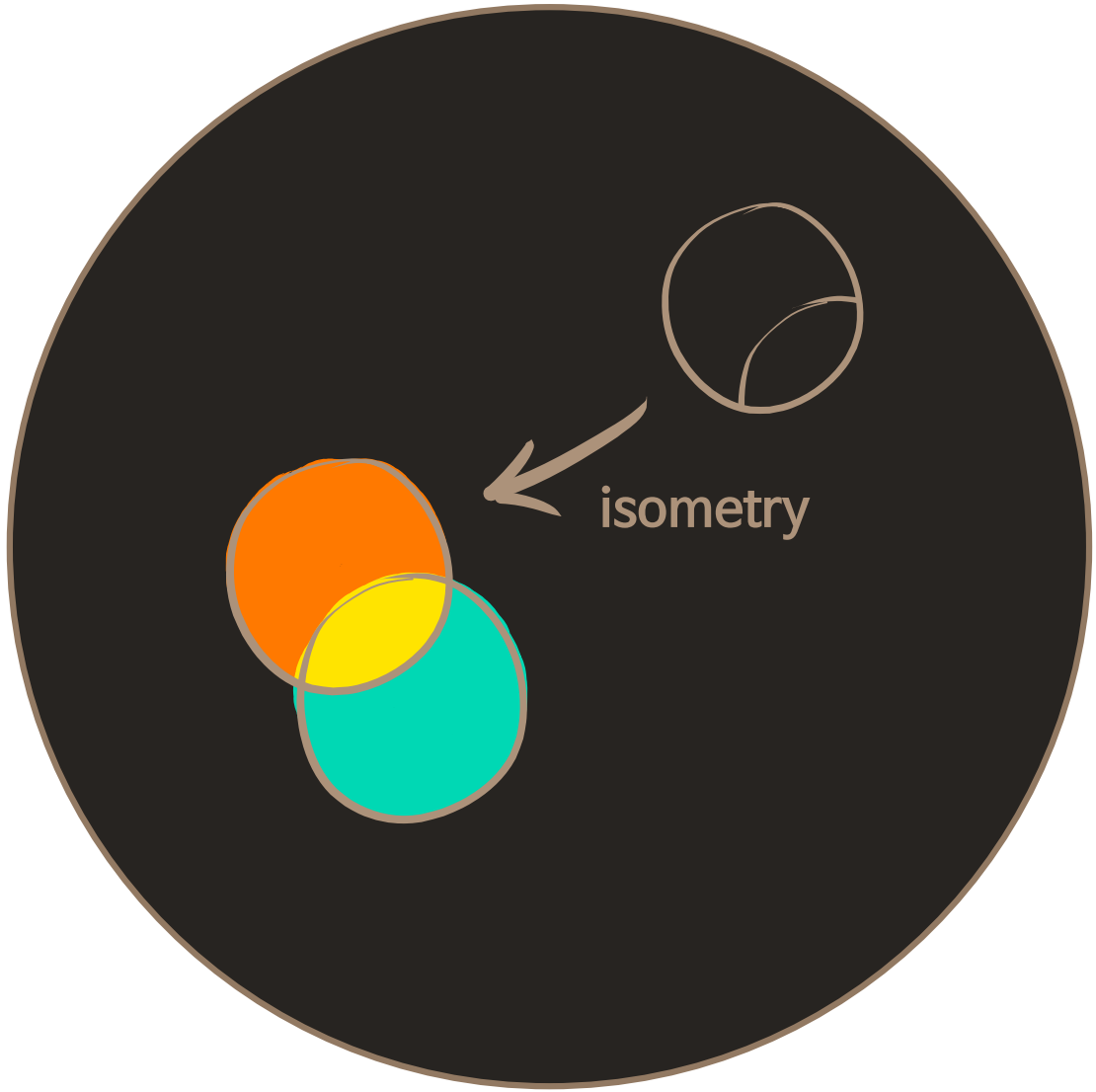

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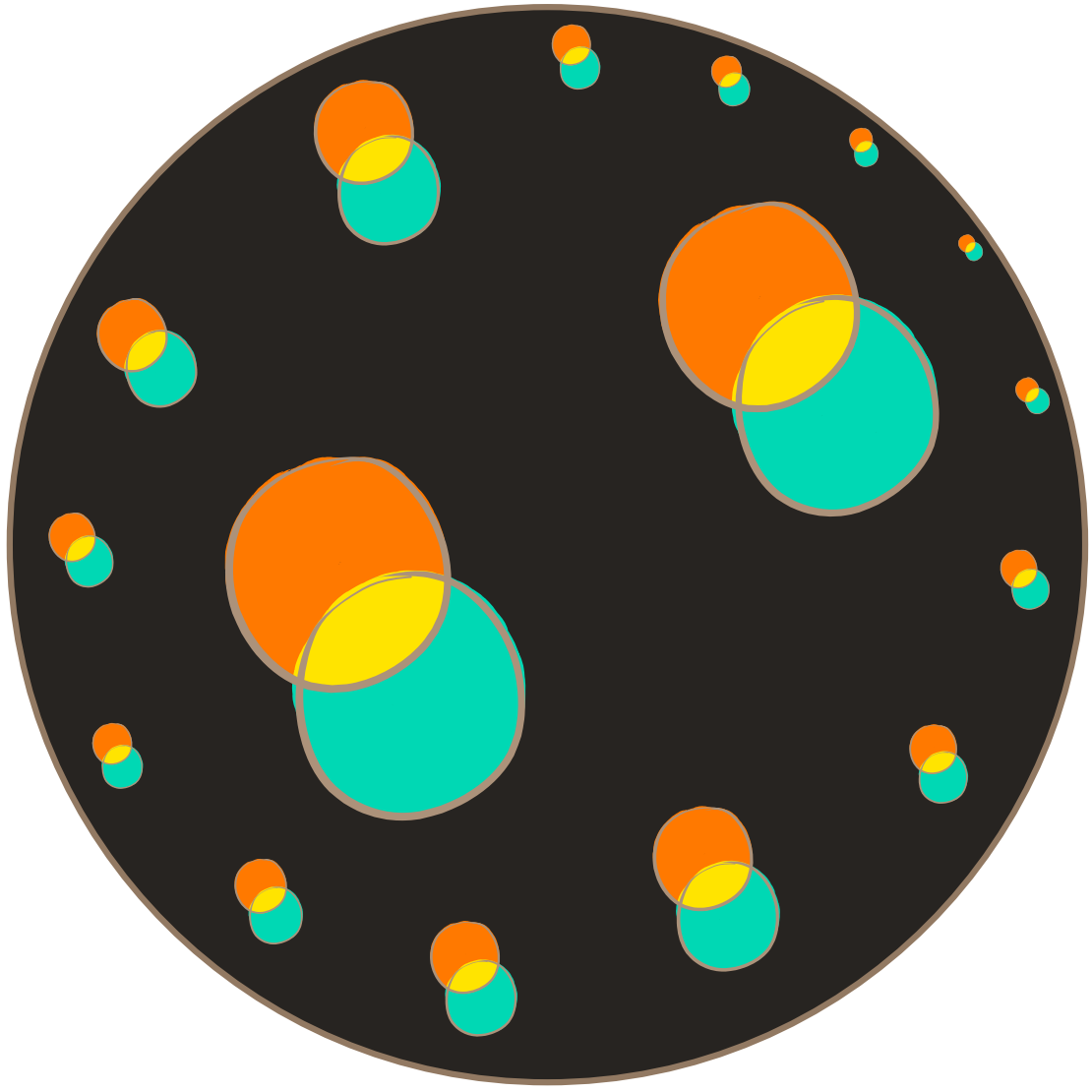
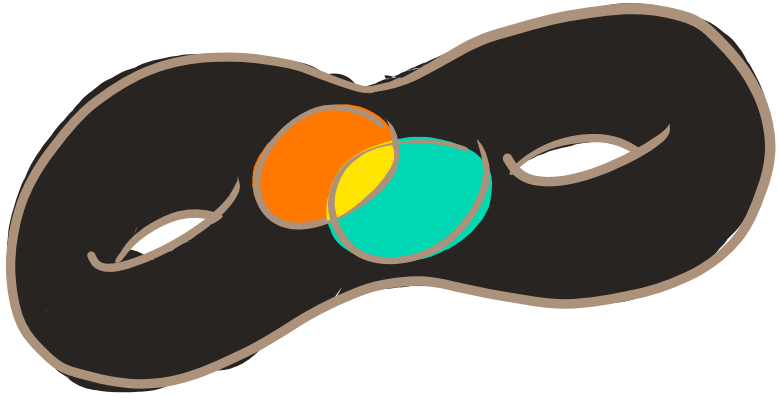


hyperbolic plane

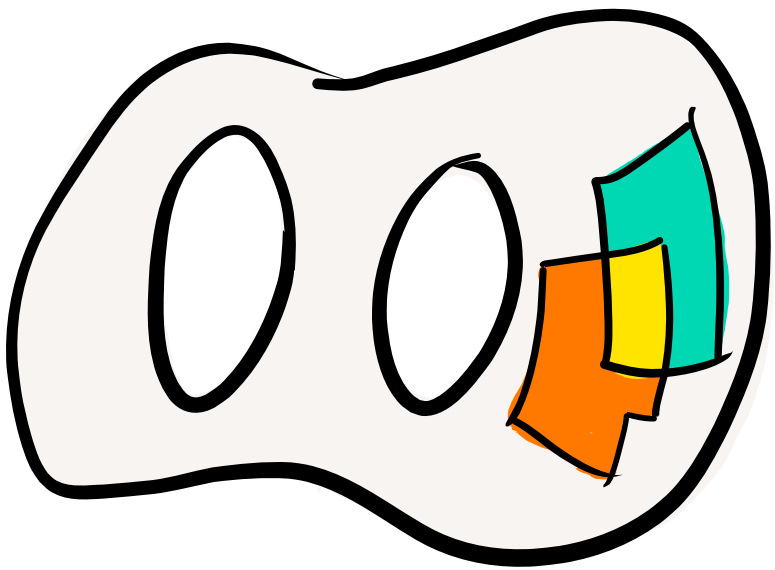
universal cover

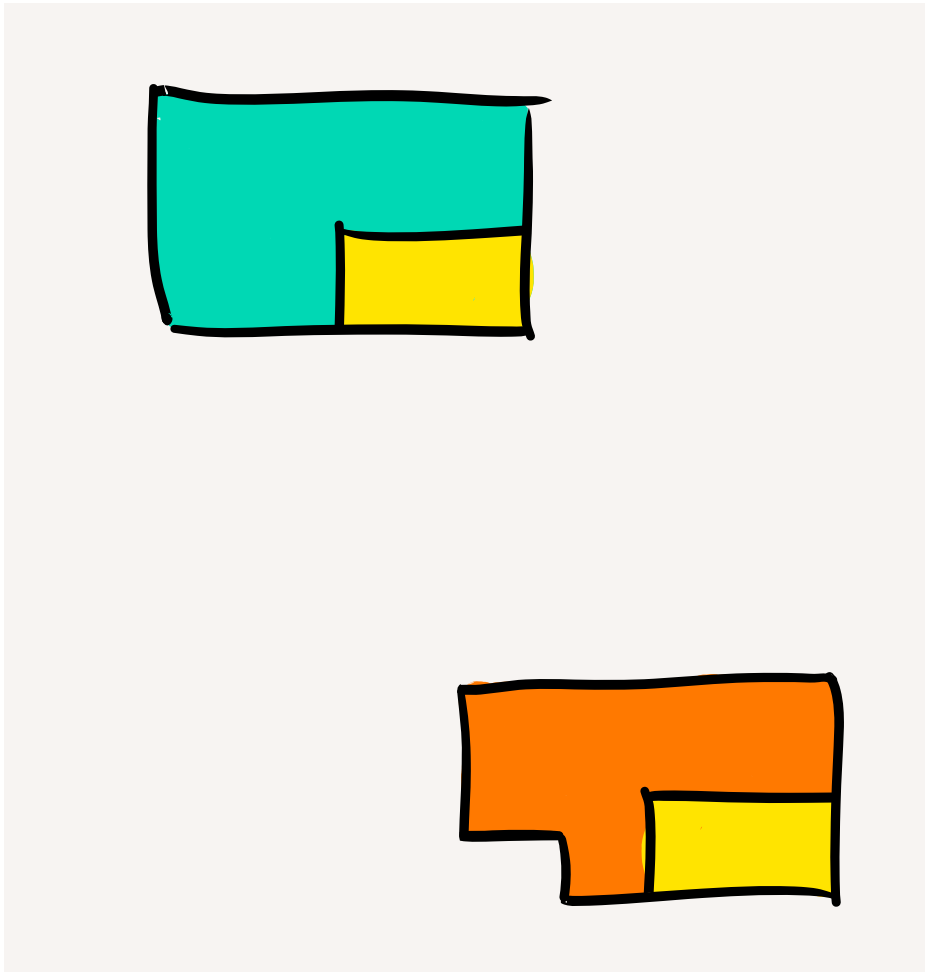


Half-translation surface

Modeled on euclidean plane, with translations and 180° flips as symmetries.

Has curvature concentrated at conical singularities.





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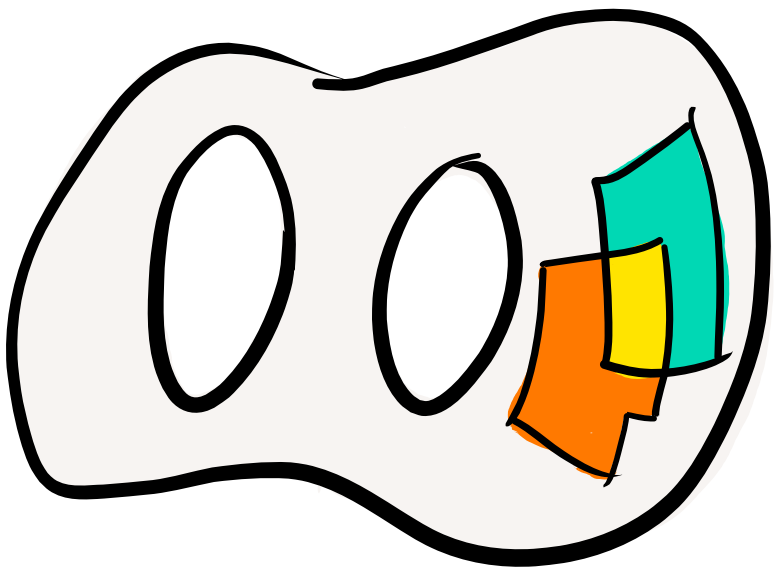

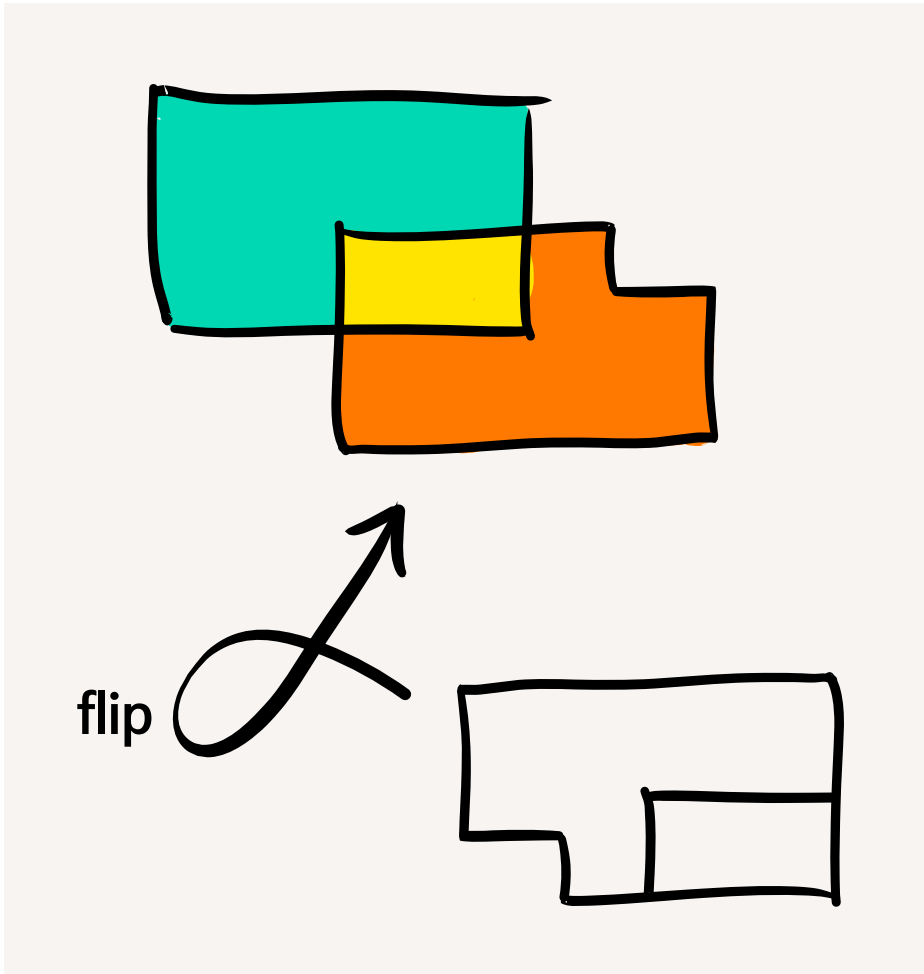

euclidean plane

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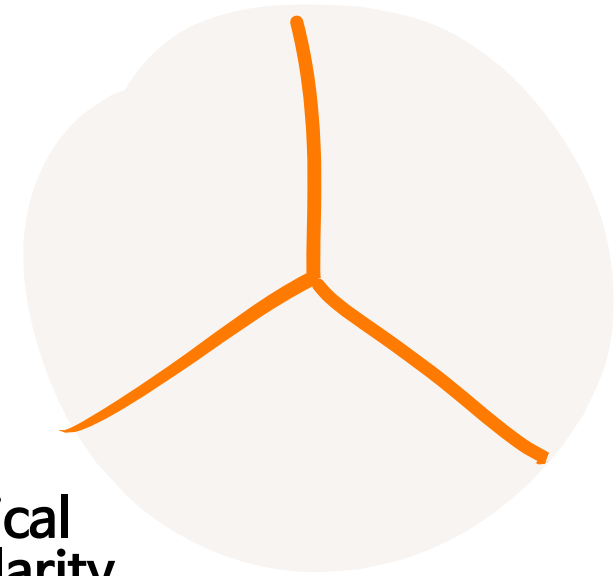
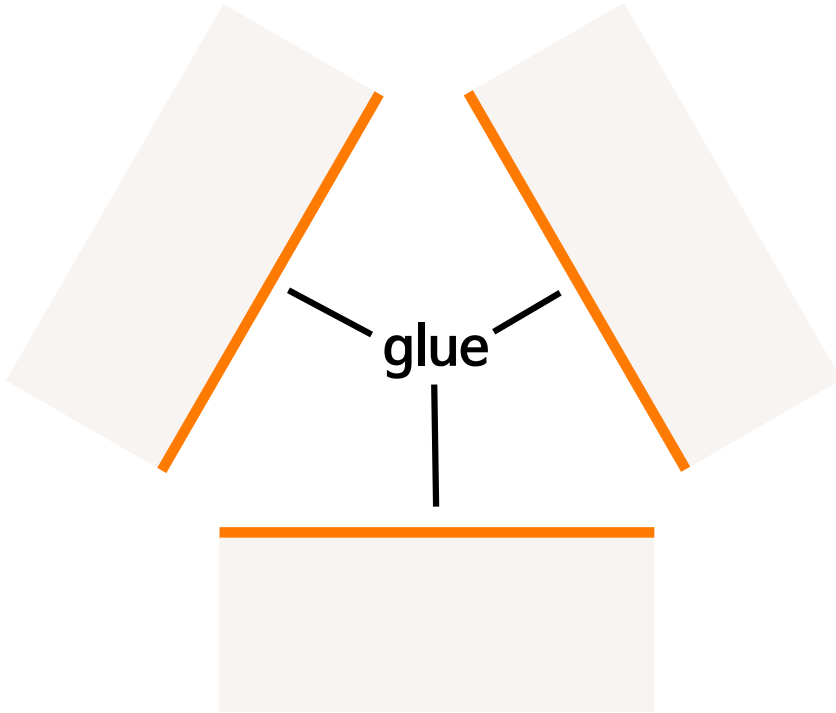
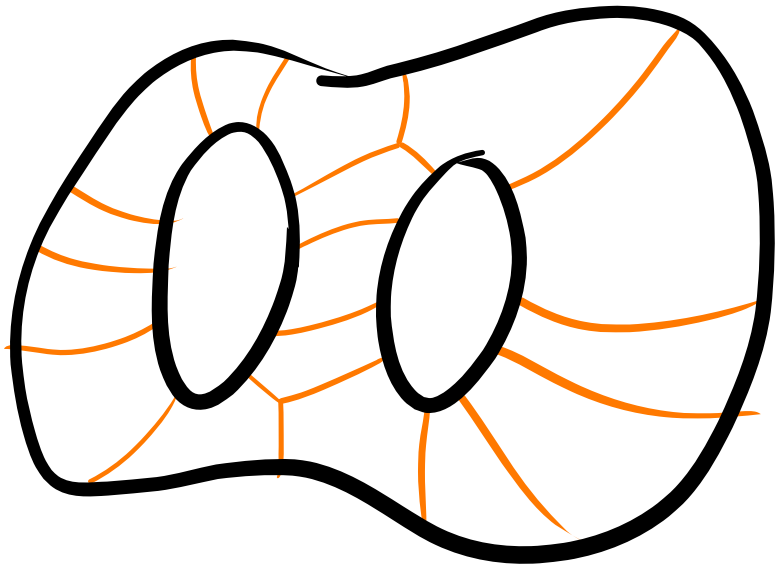


conical
singularity



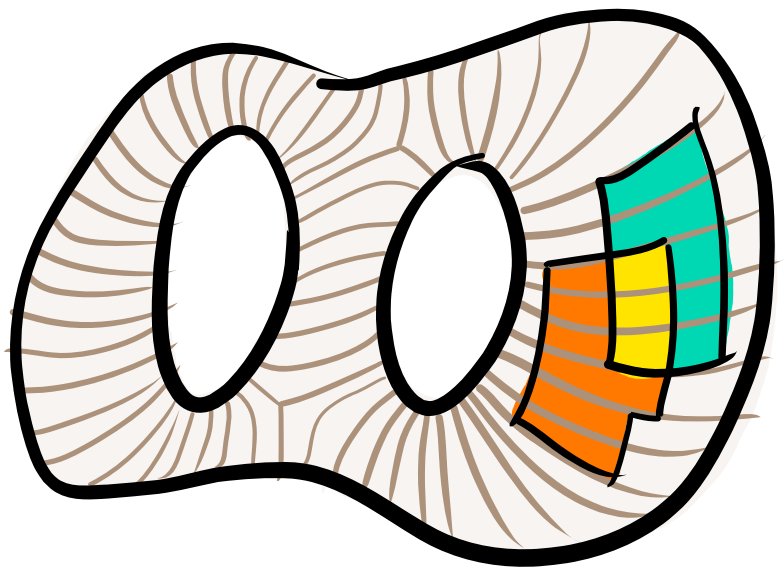


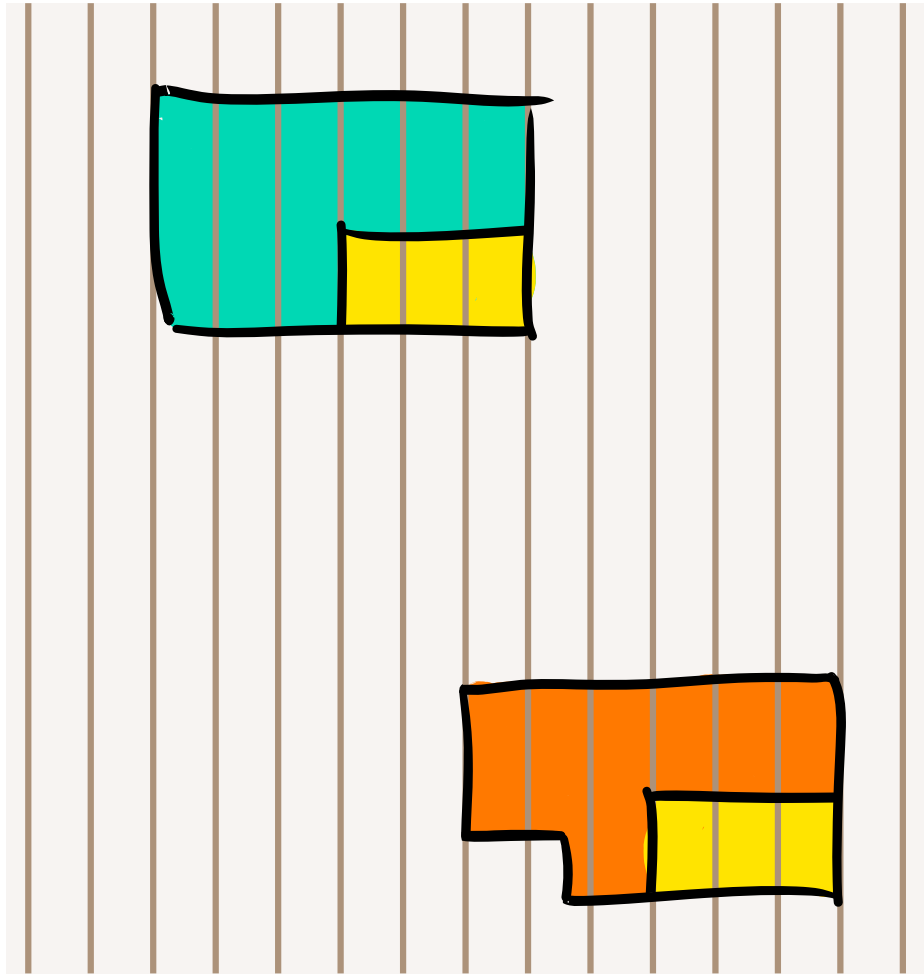
Half-translation surface

with its geodesic foliation

The foliations of the charts by vertical lines fit together into a foliation of the surface.

Horizontal distance gives a local measure on swaths of leaves.





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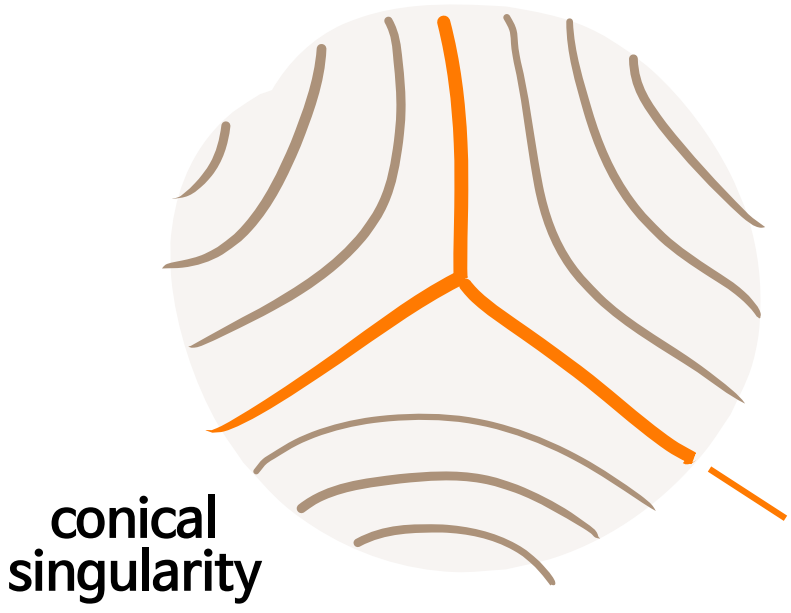
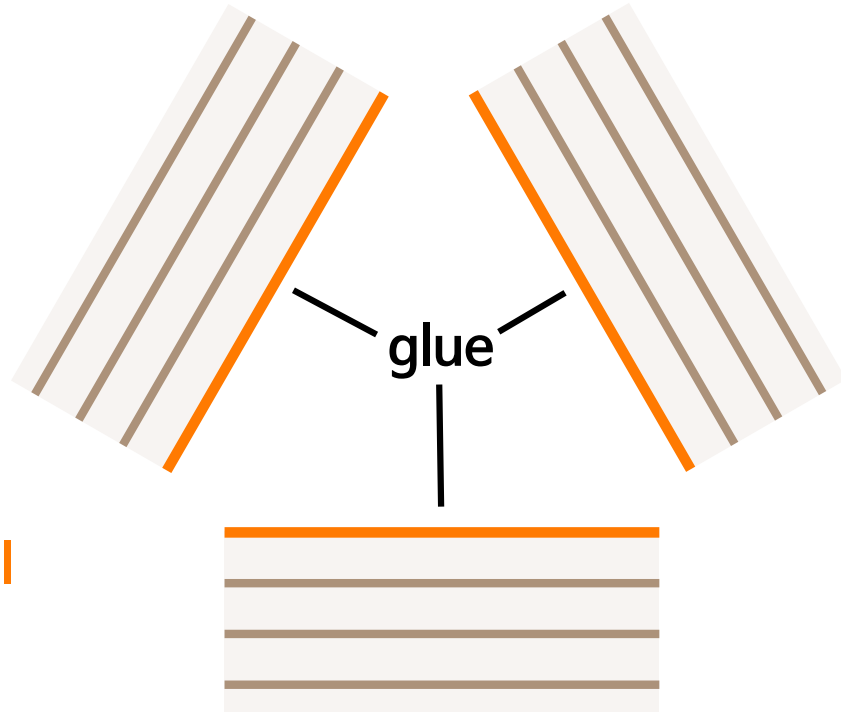
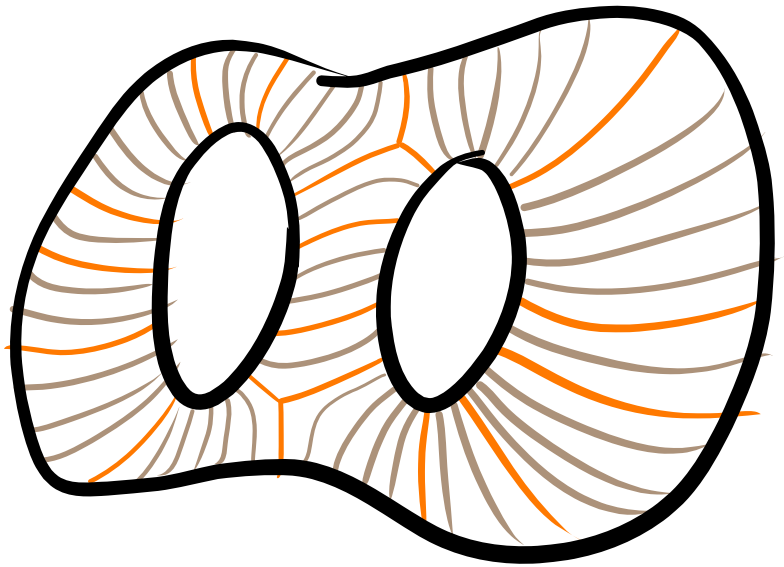


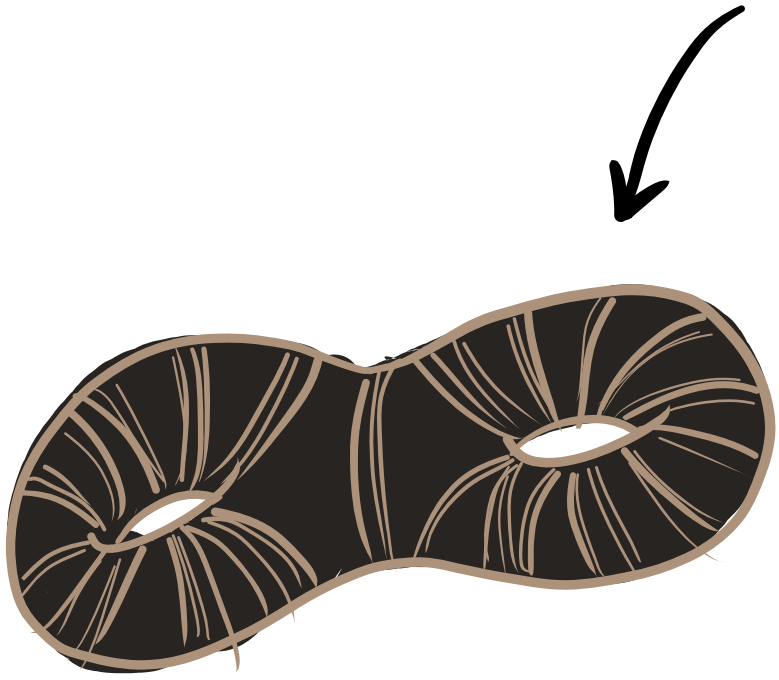




Hyperbolic surface
with a geodesic lamination

The closest thing to a geodesic foliation is a maximal collection of non-intersecting geodesics.

Measure assigns a “thickness” to each swath of leaves.



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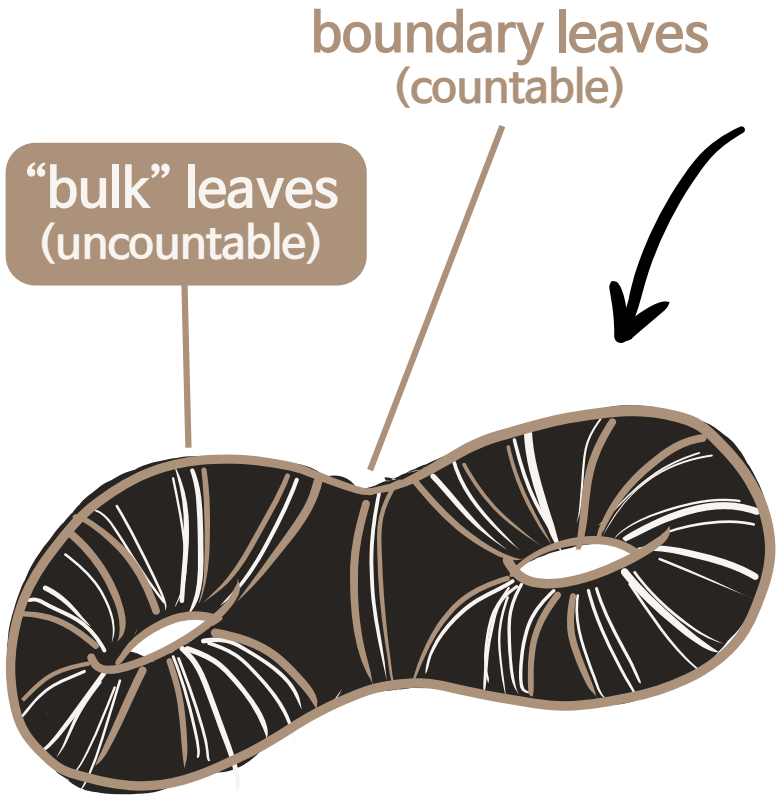
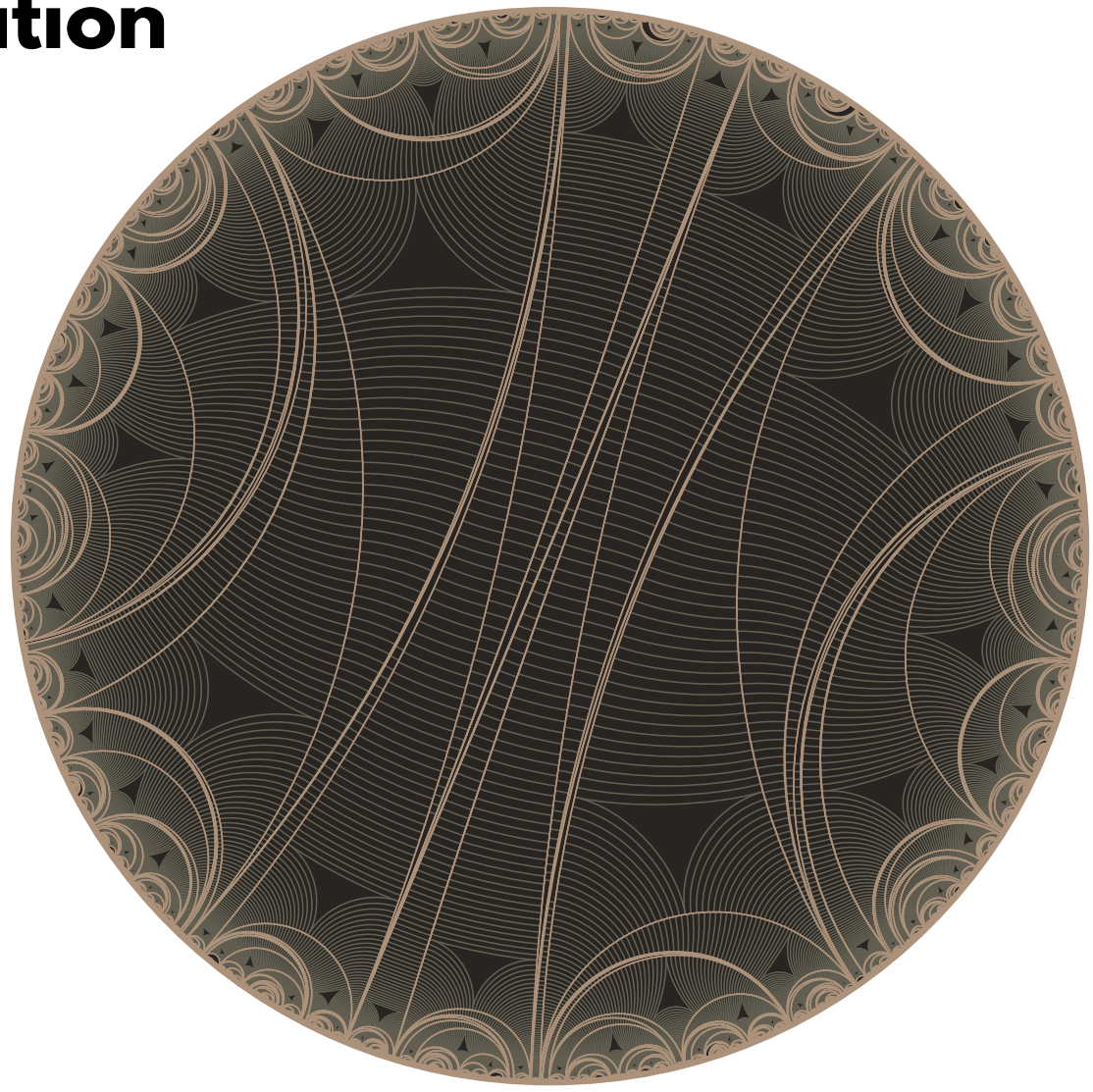
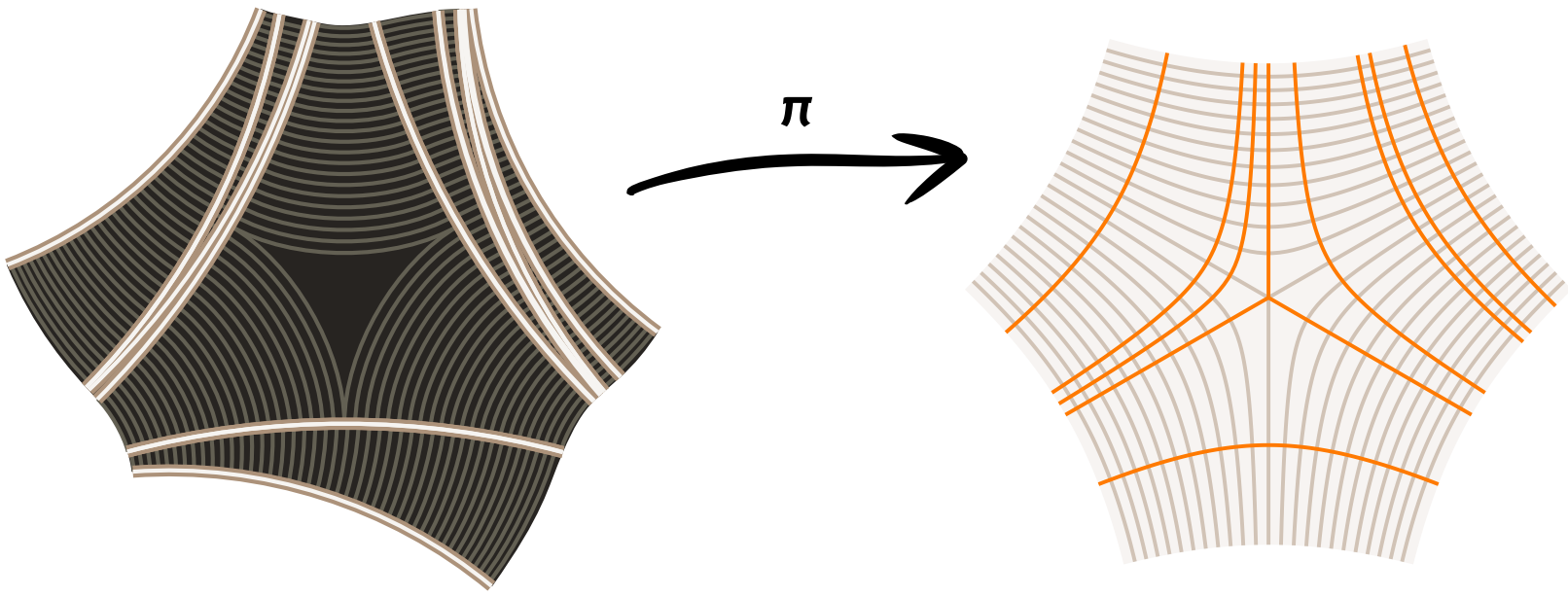


The horocyclic foliation
from a geodesic lamination



Twisting
of collapsed holonomy bundle



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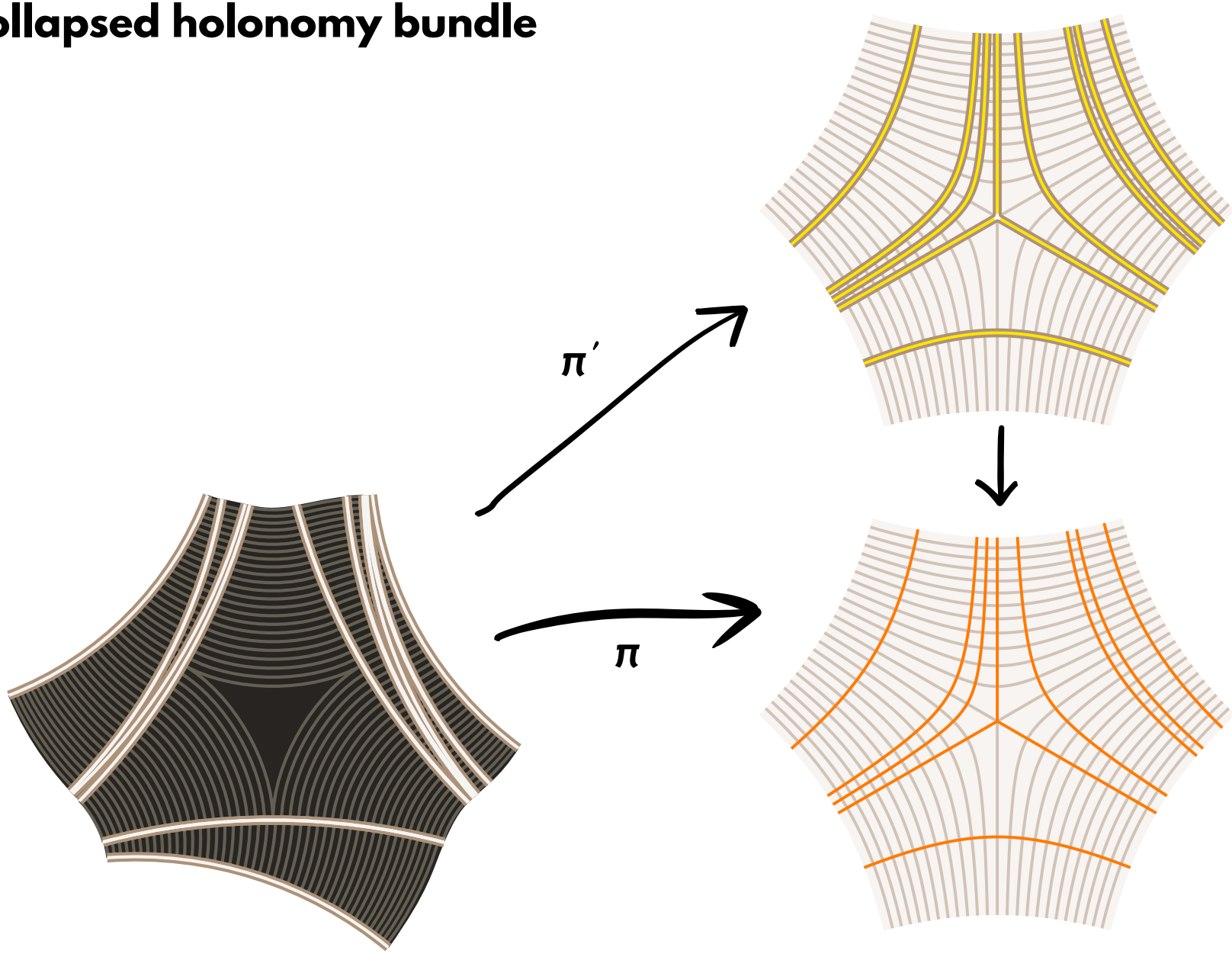

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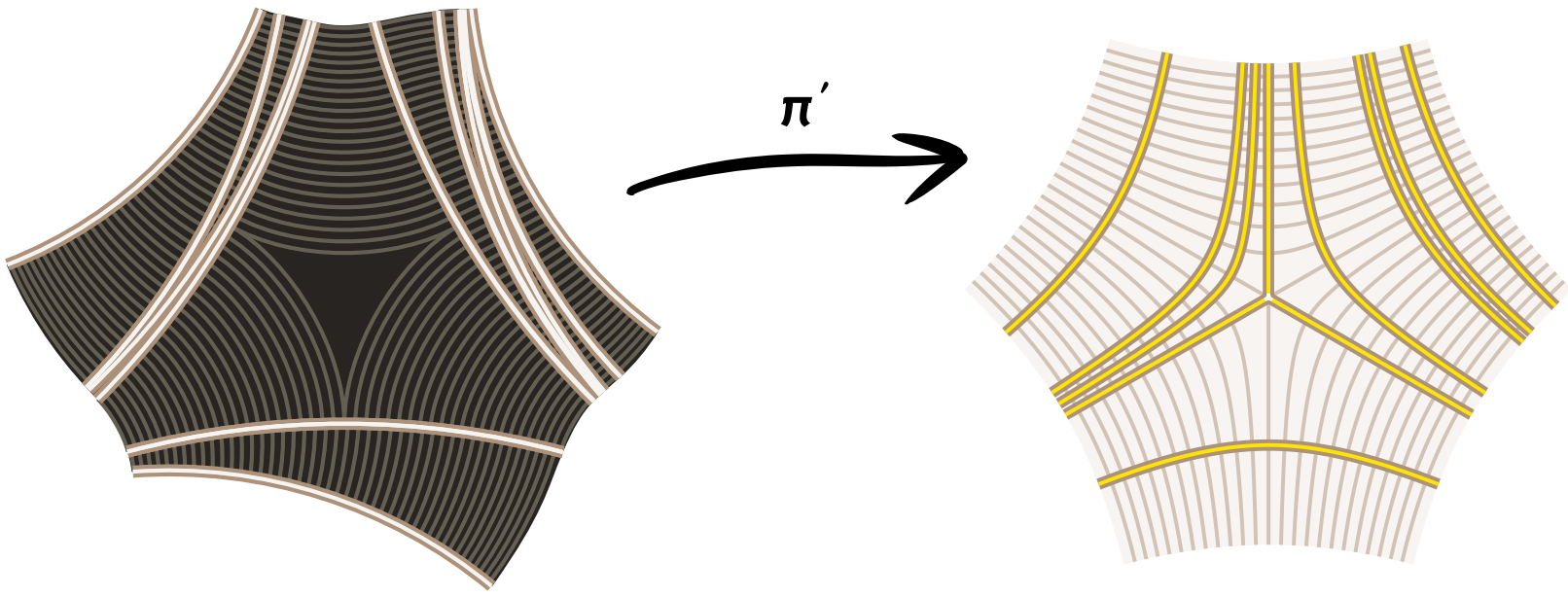

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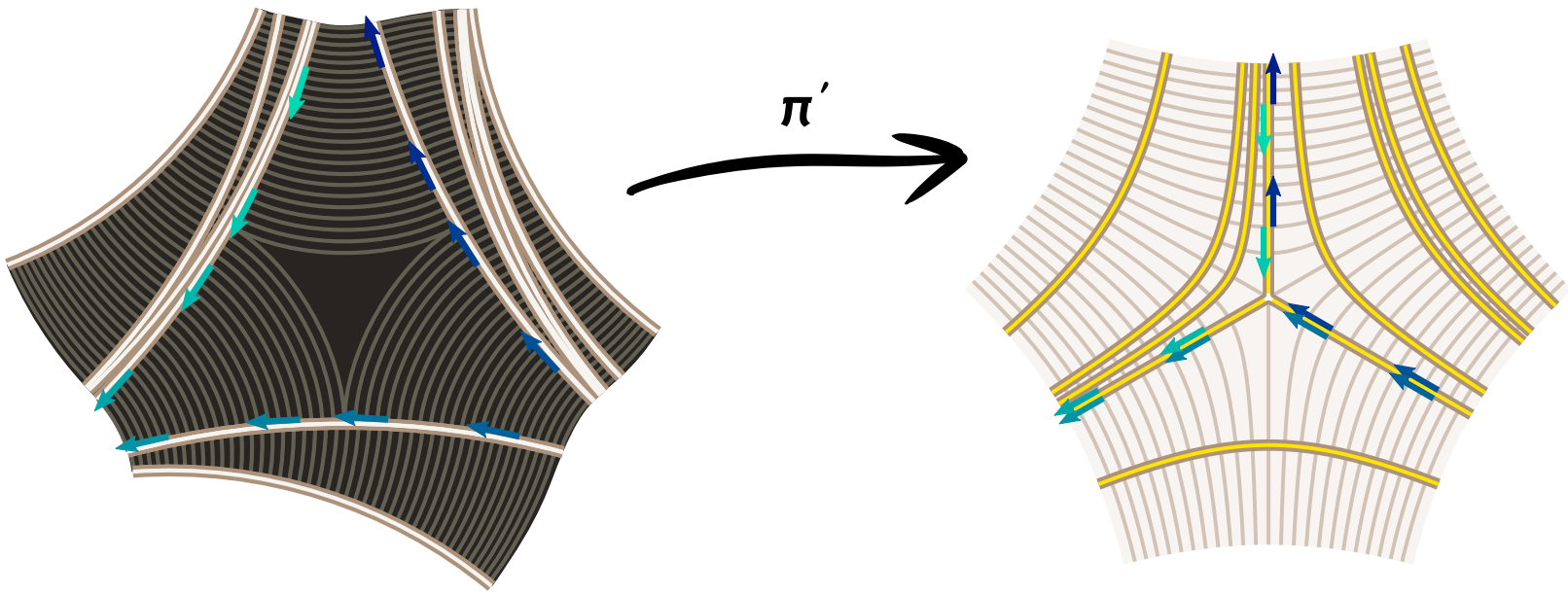

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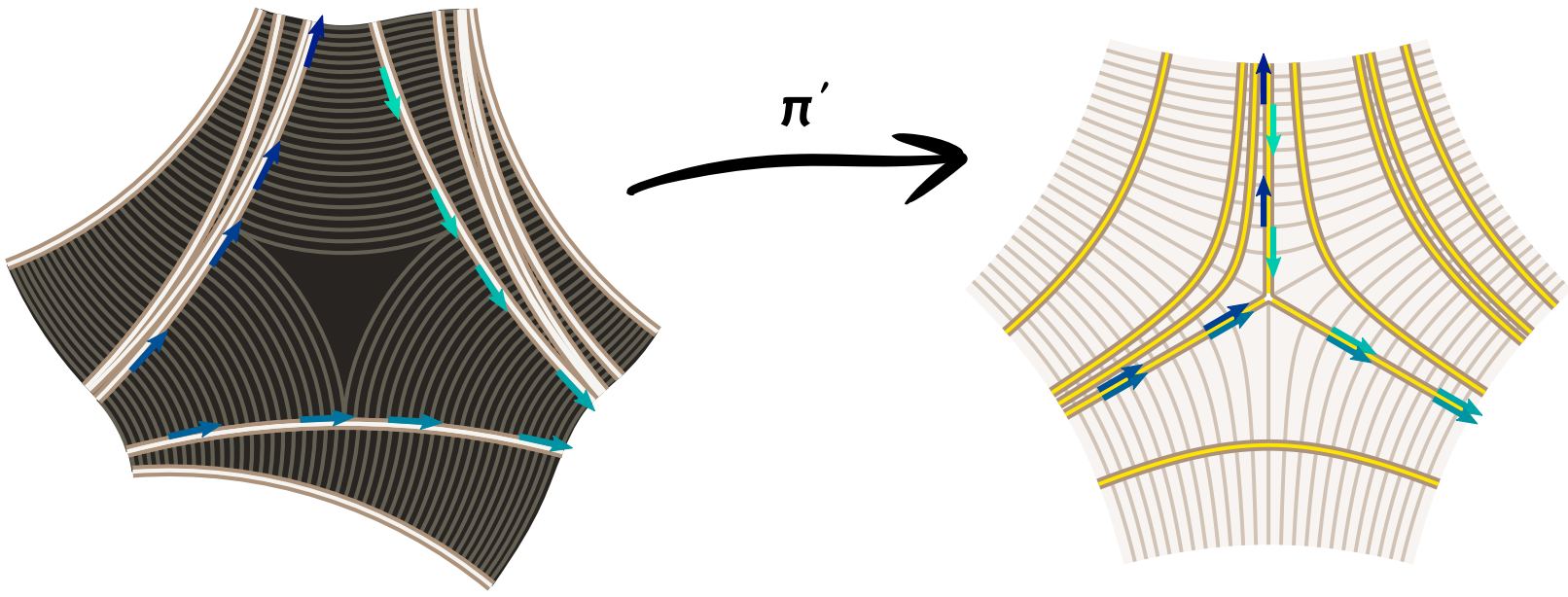

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