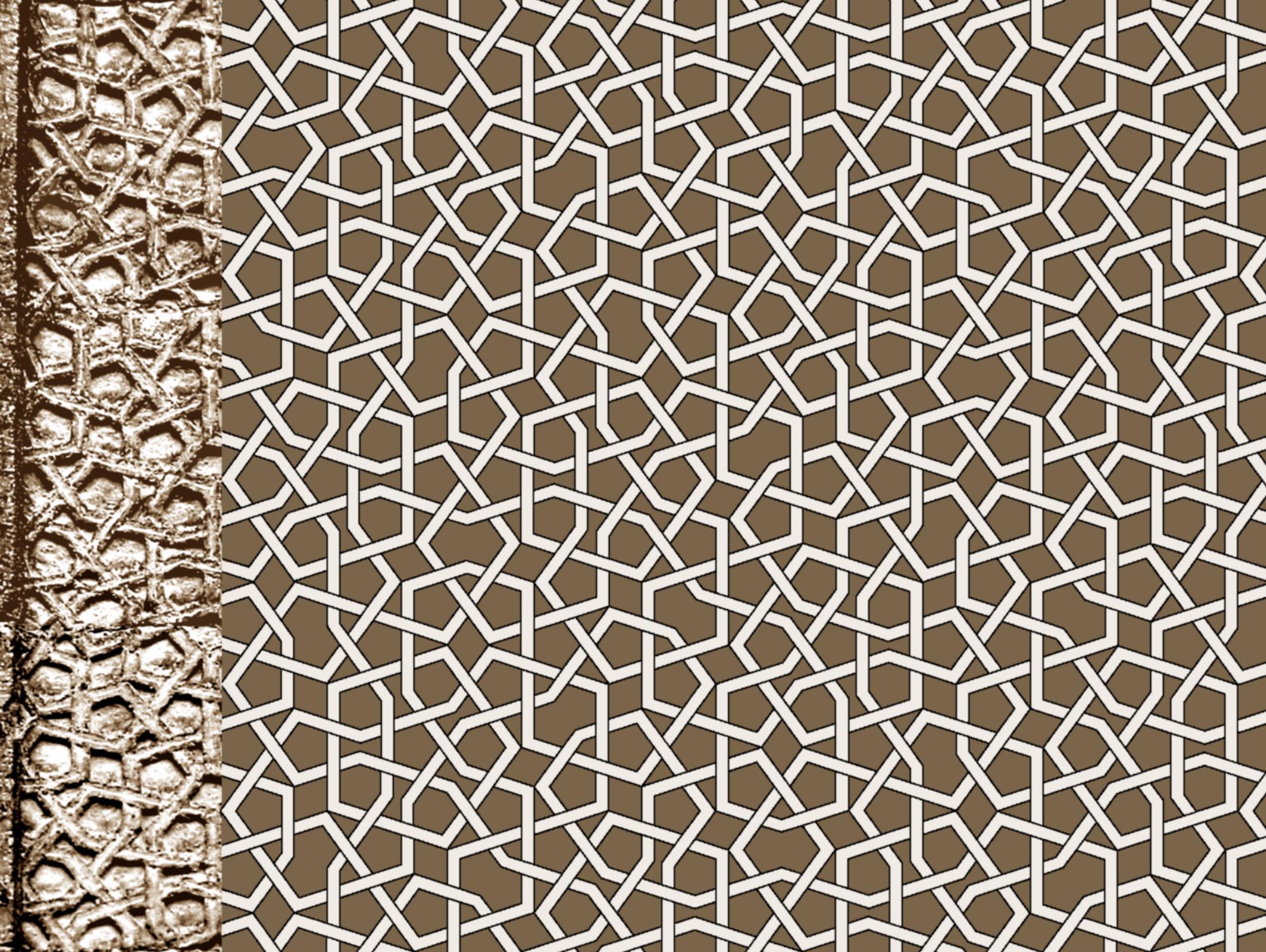
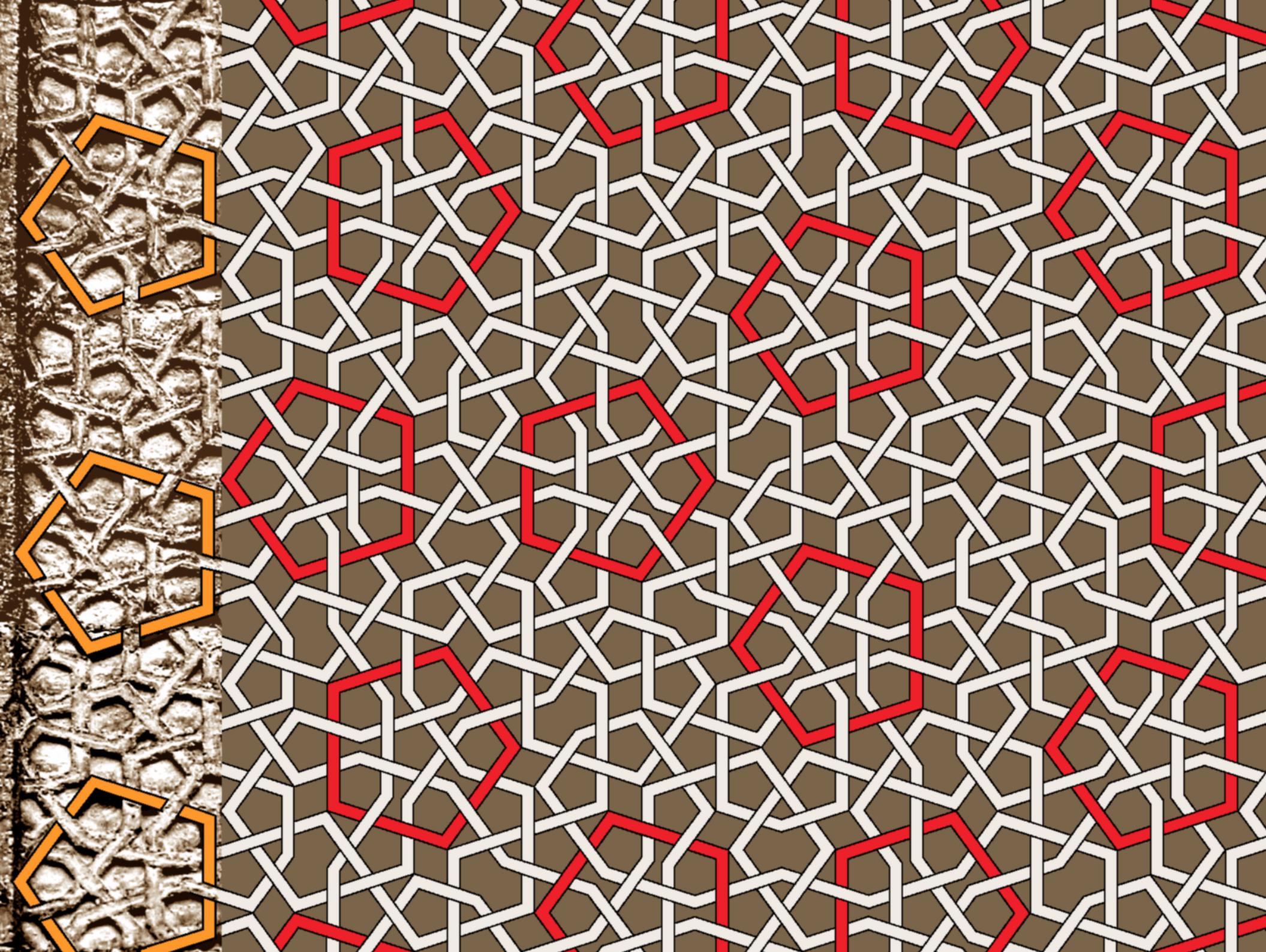
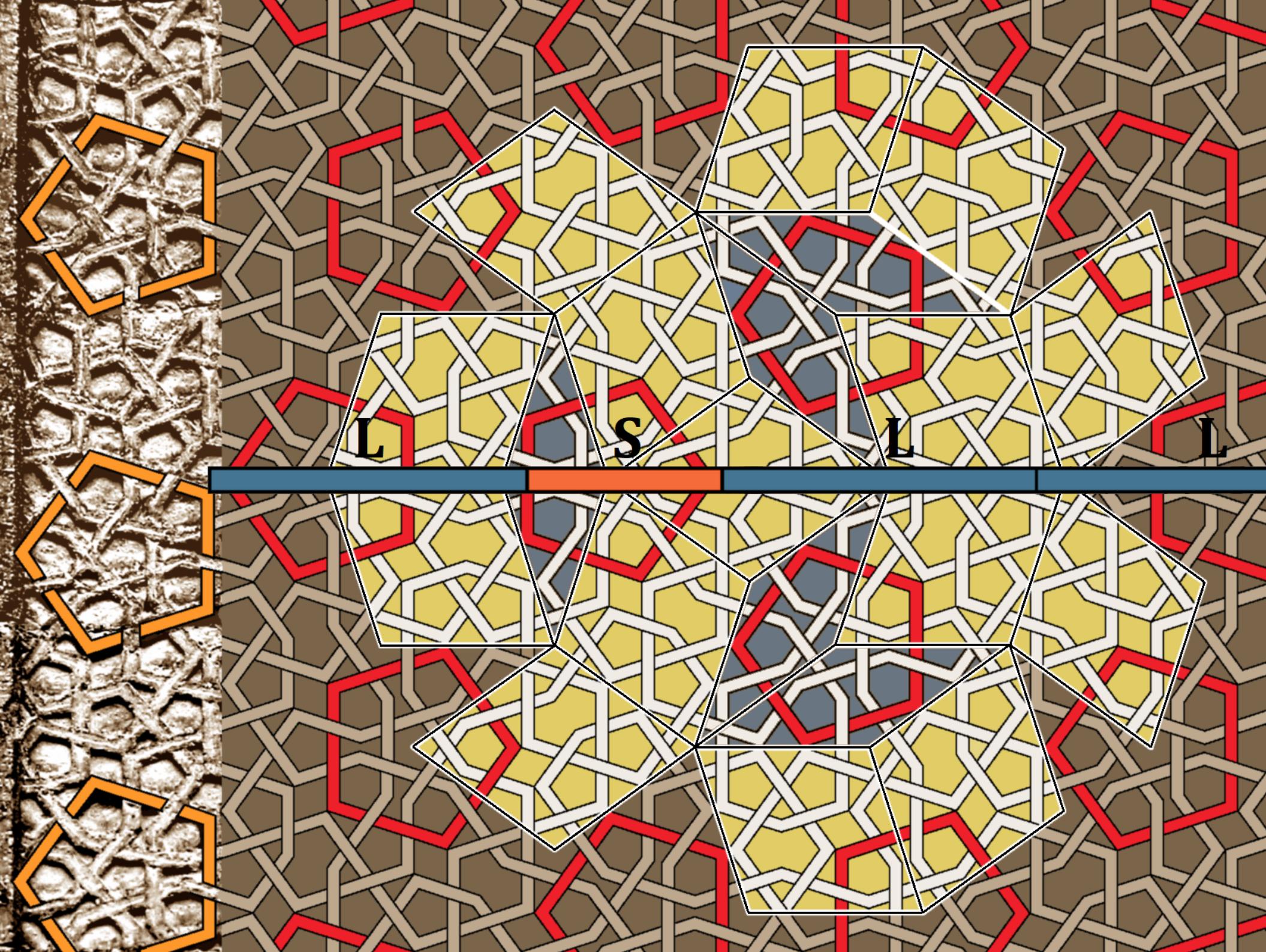
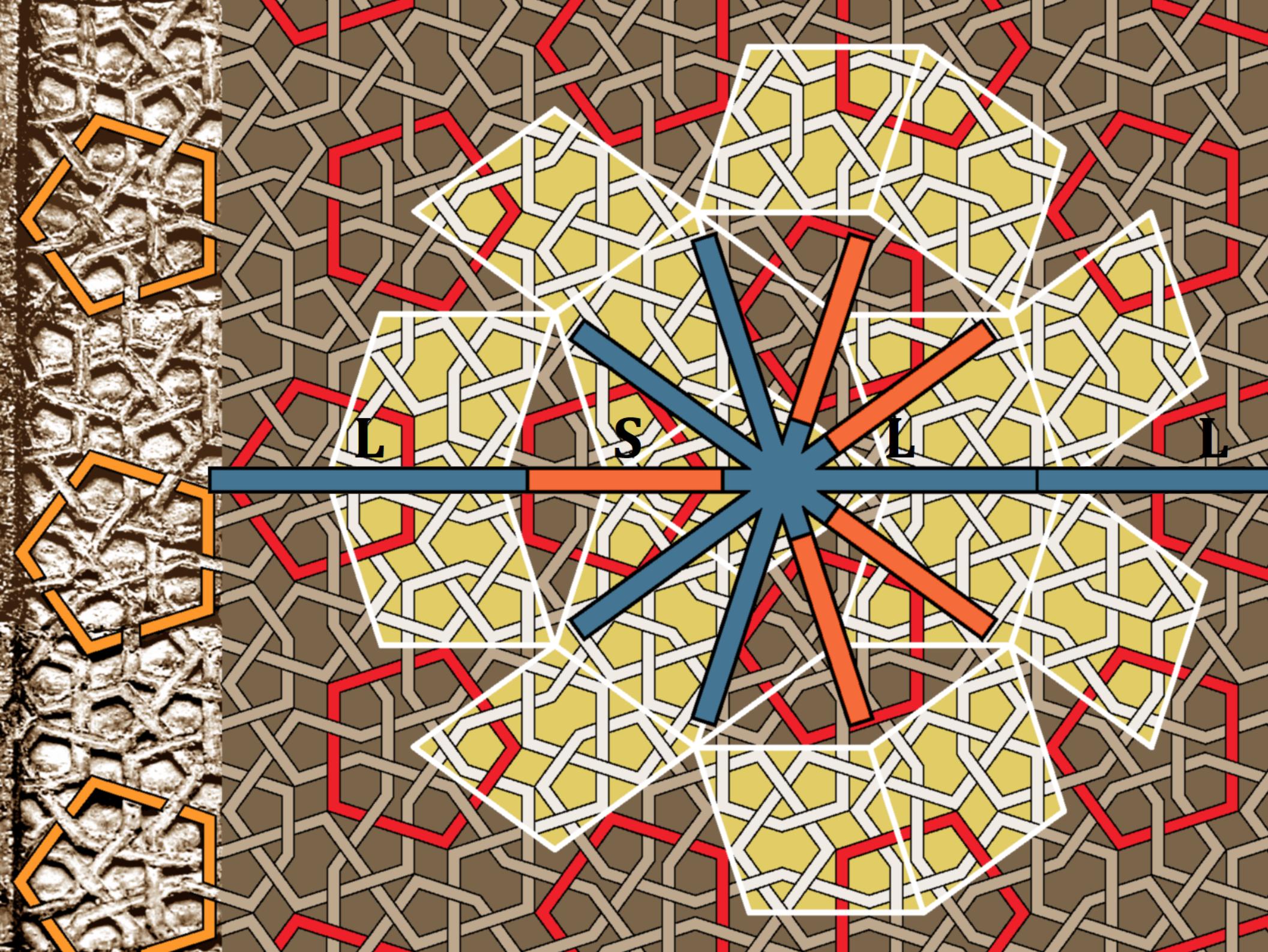


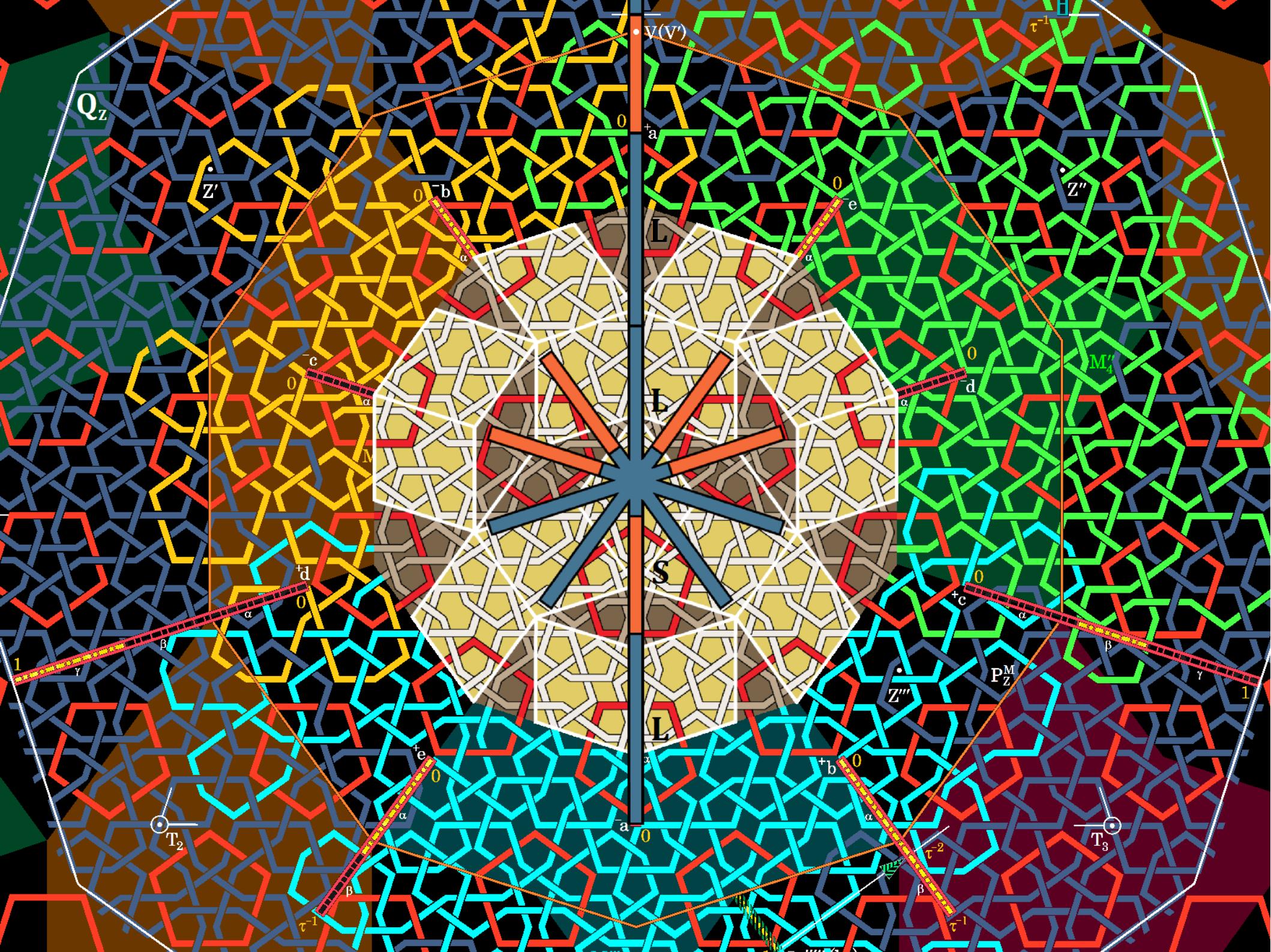
The photo above by David Wade shows a Girih pattern from Hatuniye complex in Kayseri, Turkey (<https://www.davidwade.com/2012/07/01/girih-patterns-in-hatuniye-complex-kayseri-turkey/>). The left part of the photo gave the inspiration for the graphic *Quasicrystalline Wickerwork*. The following are unexpected properties of the slightly modified pattern with respect to the quasi-cell **Q**.

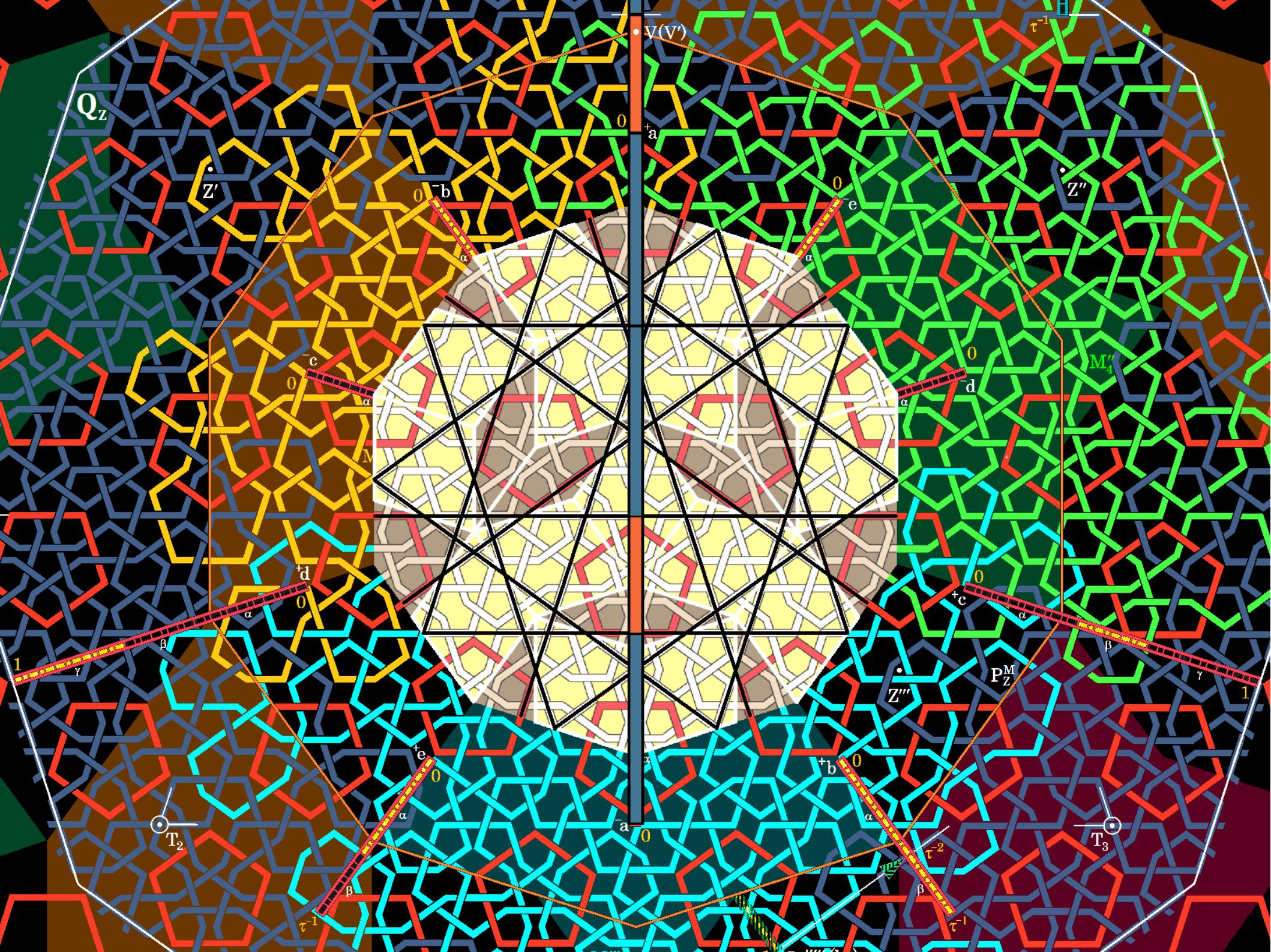


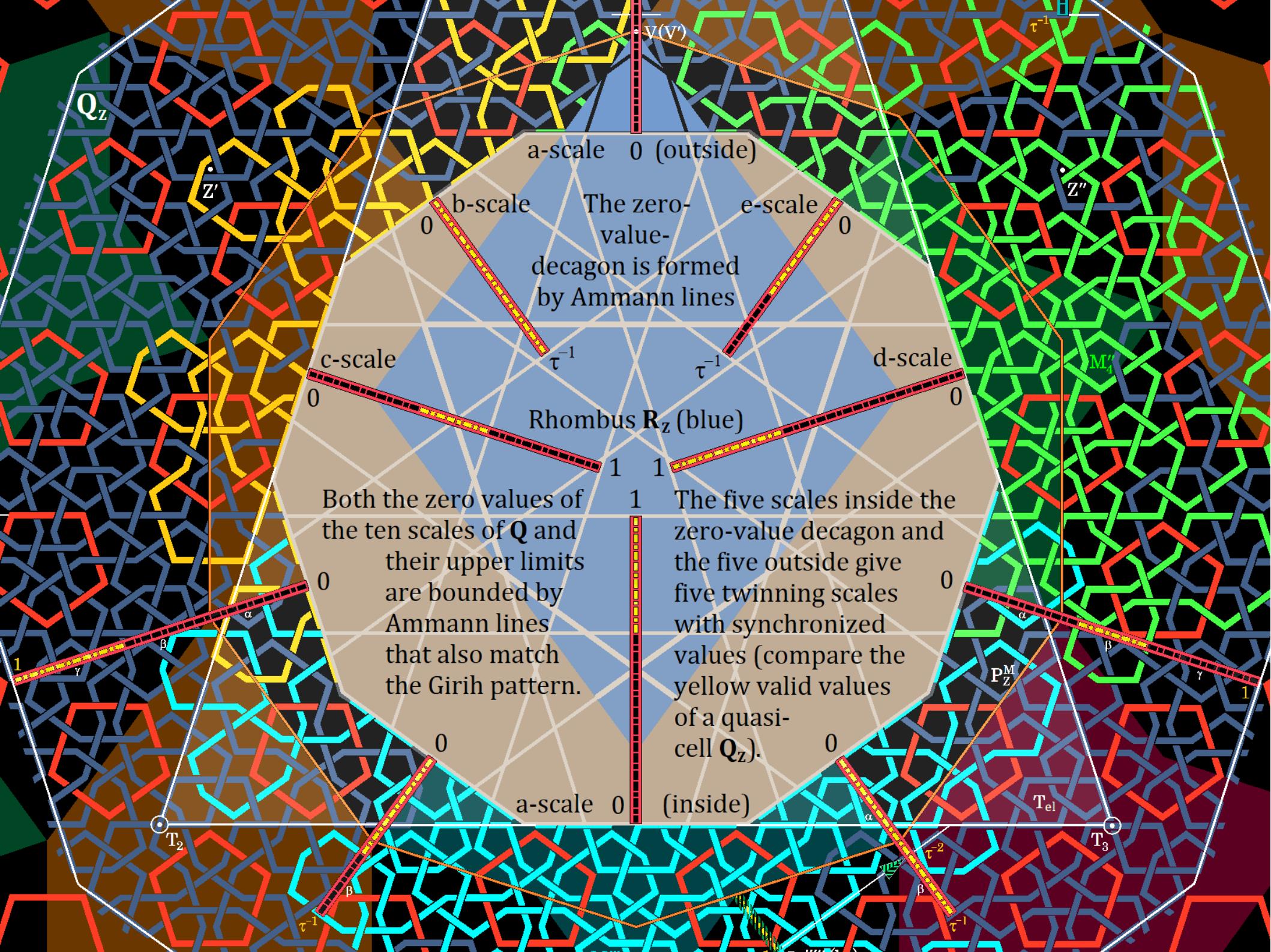


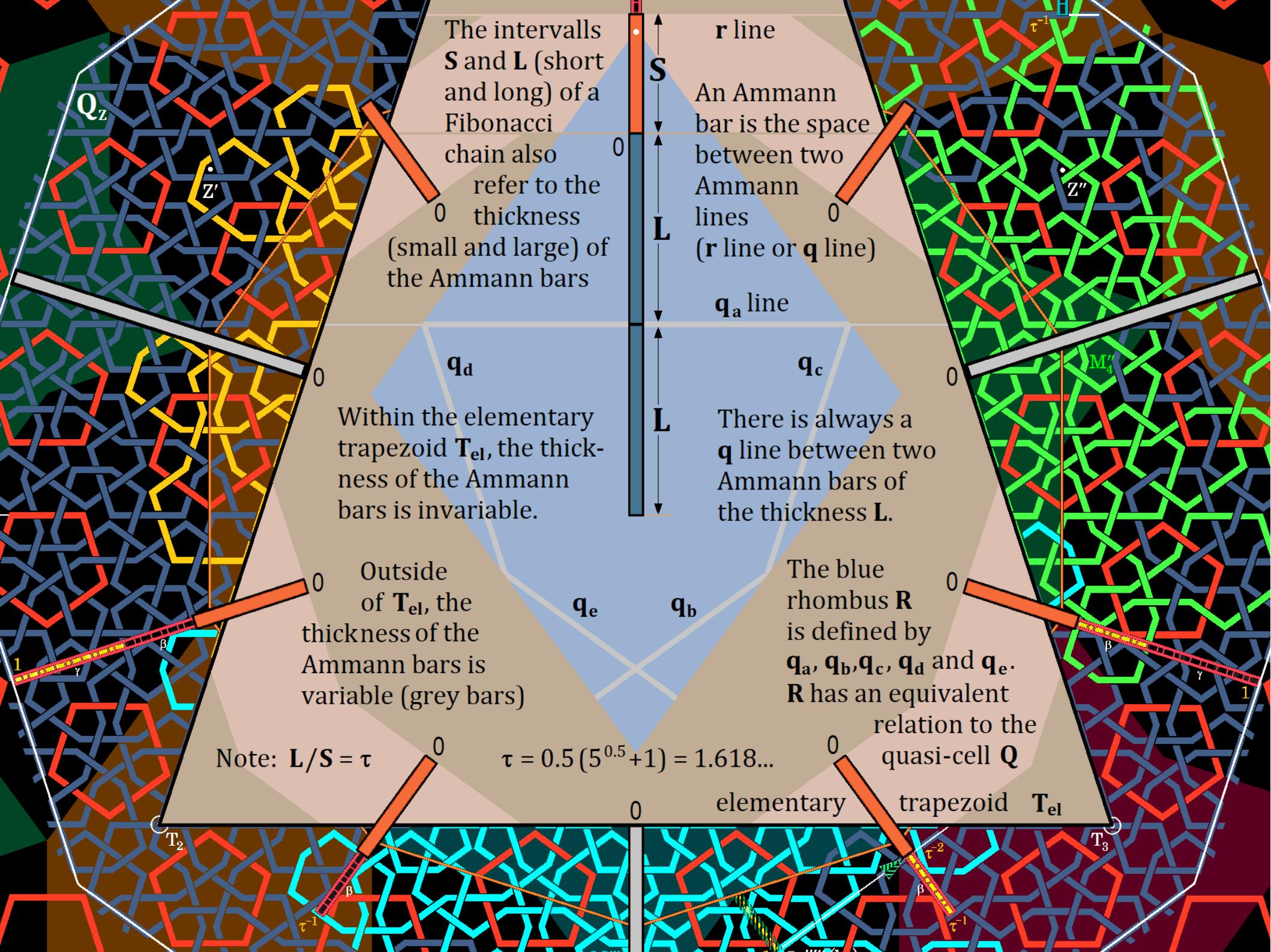












The intervals S and L (short and long) of a Fibonacci chain also refer to the thickness (small and large) of the Ammann bars

r line

An Ammann bar is the space between two Ammann lines (r line or q line)

q_a line

q_c

There is always a q line between two Ammann bars of the thickness L .

The blue rhombus R is defined by q_a, q_b, q_c, q_d and q_e . R has an equivalent relation to the quasi-cell Q elementary trapezoid T_{el}

Note: $L/S = \tau$

$$\tau = 0.5(5^{0.5} + 1) = 1.618\dots$$

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z

A

B

C

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S''''''''''''

T''''''''''''

U''''''''''''

V''''''''''''

W''''''''''''

X''''''''''''

Y''''''''''''

Z''''''''''''

A''''''''''''''

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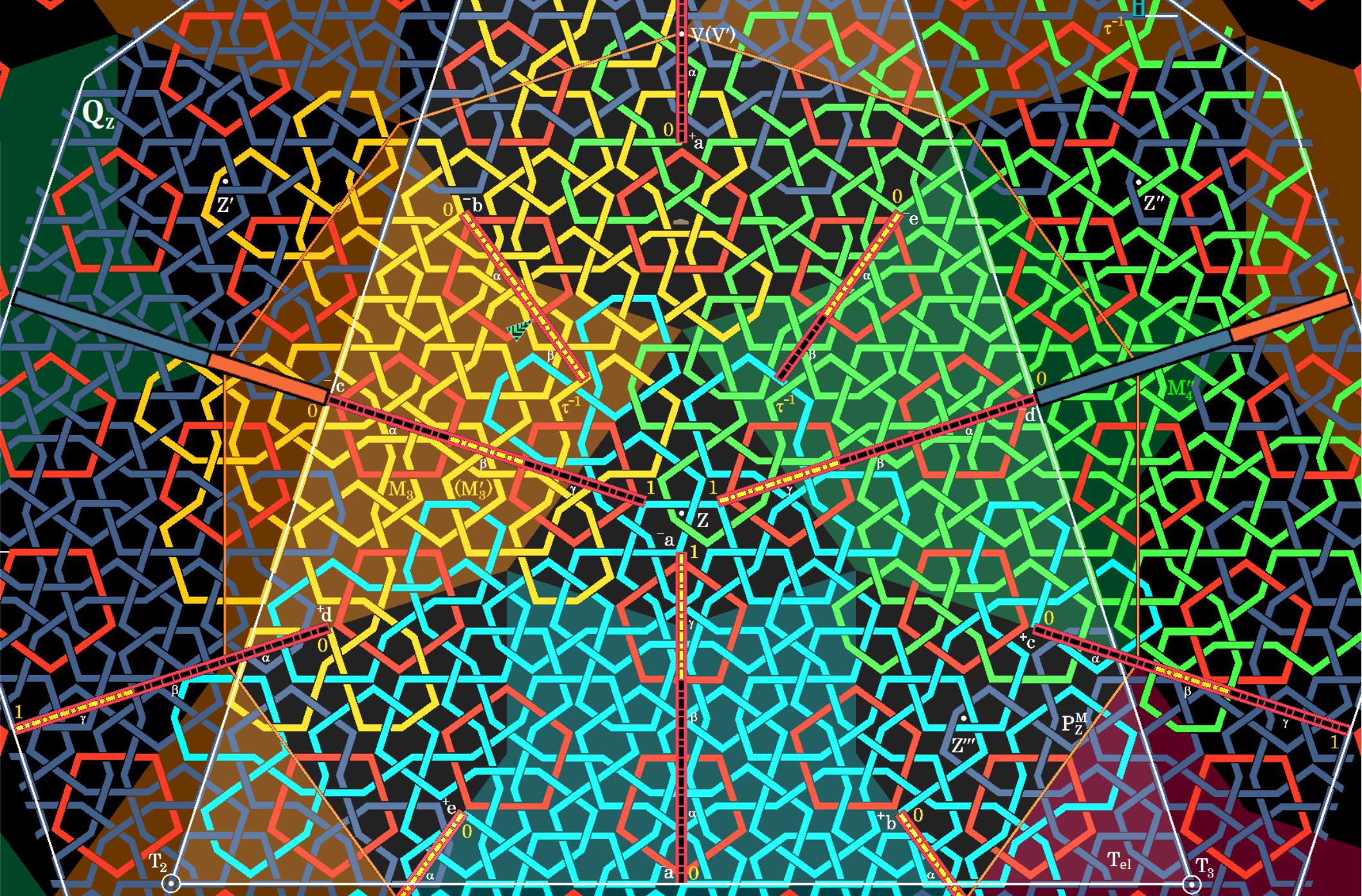
H''''''''''''''

I''''''''''''''

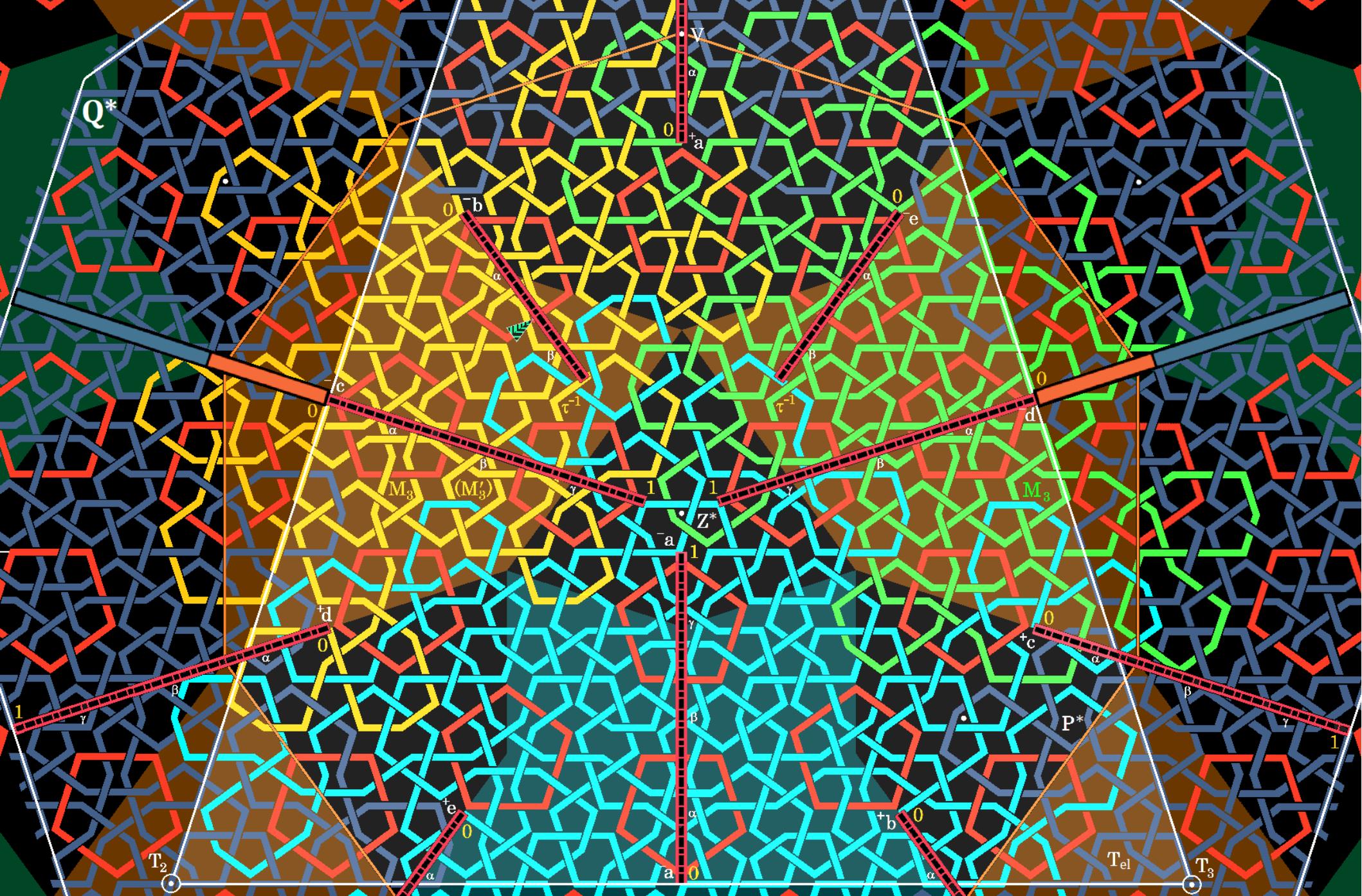
J''''''''''''''

K''''''''''''''

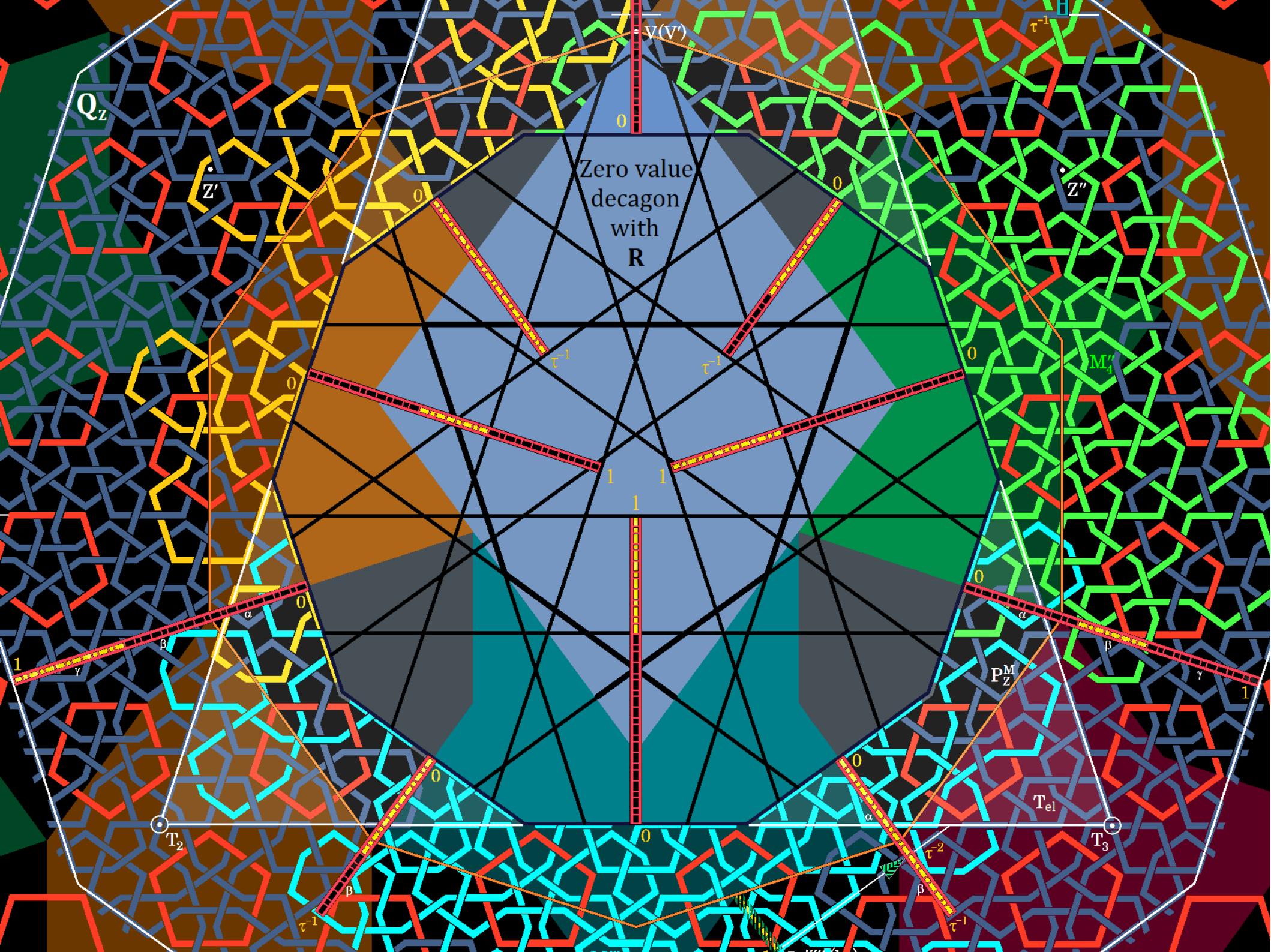
M''''''''''''''

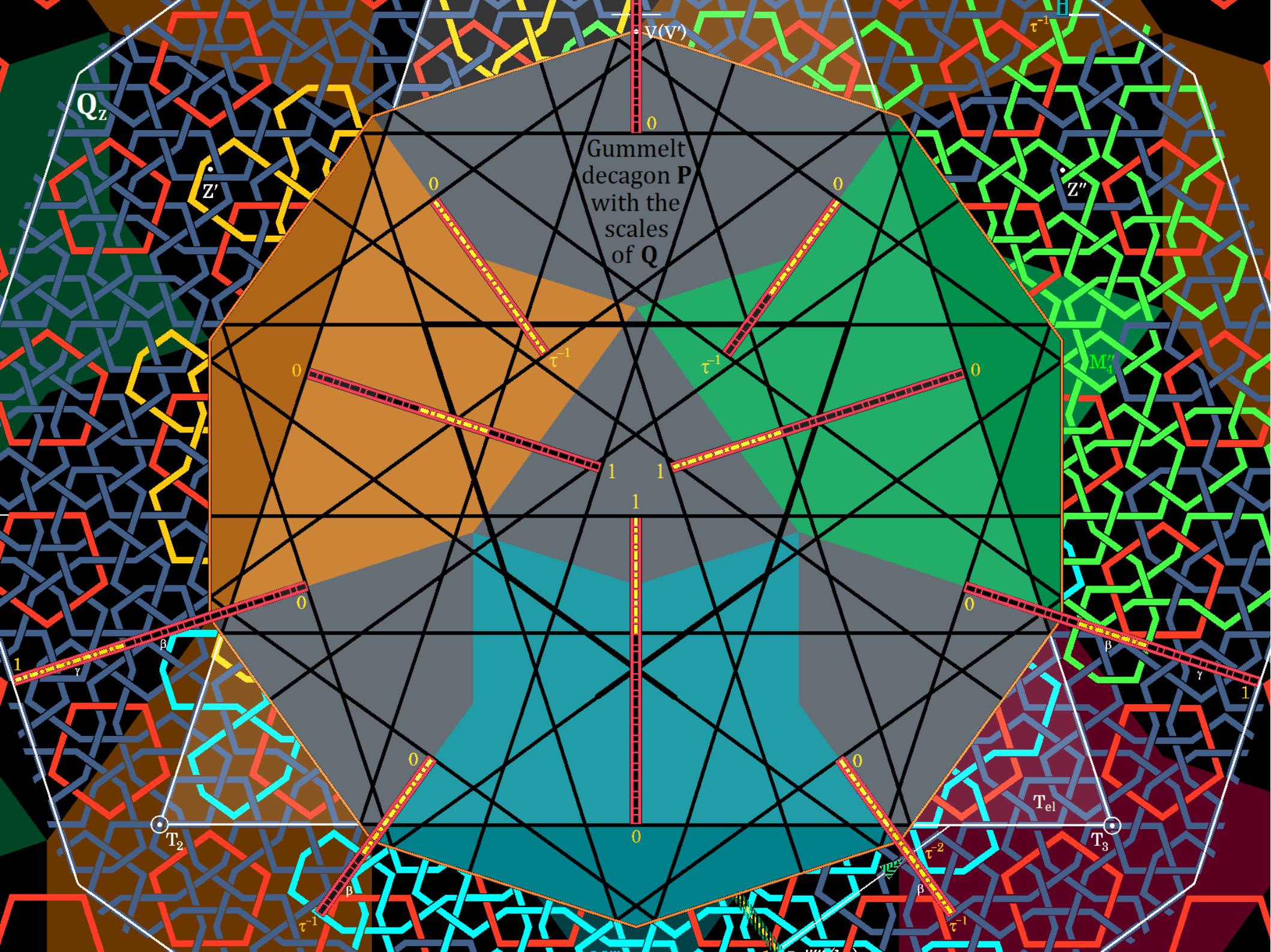


The variability of the quasi-cells Q in regions that do not belong to the elementary trapezoid T_{el} can be clearly seen by the example of the asymmetric state of the cell Q_z . While on the left leg of the trapezoid T_{el} there is an Ammann bar of thickness S , on the right leg there is an Ammann bar with thickness L .

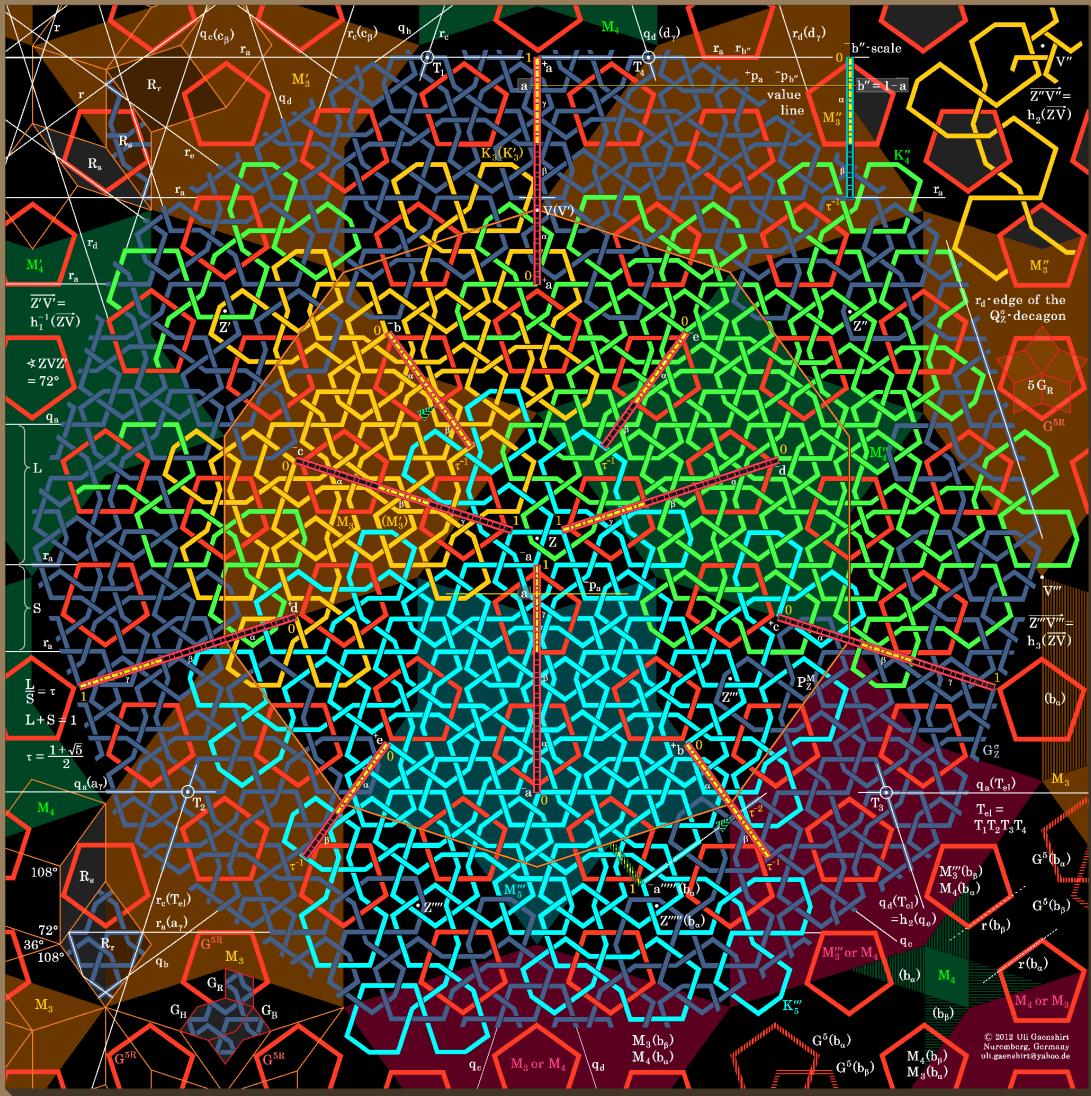


In the case of the quasi-cell Q^* , which, in contrast to the cell Q_z , has a symmetrical geometric background, there are Ammann bars of thickness S on both legs outside of T_{el} . Consequently, the Girih structure of the quasi-cell Q^* must be symmetrical too, i.e. the green endless knot has the same shape as the yellow one.

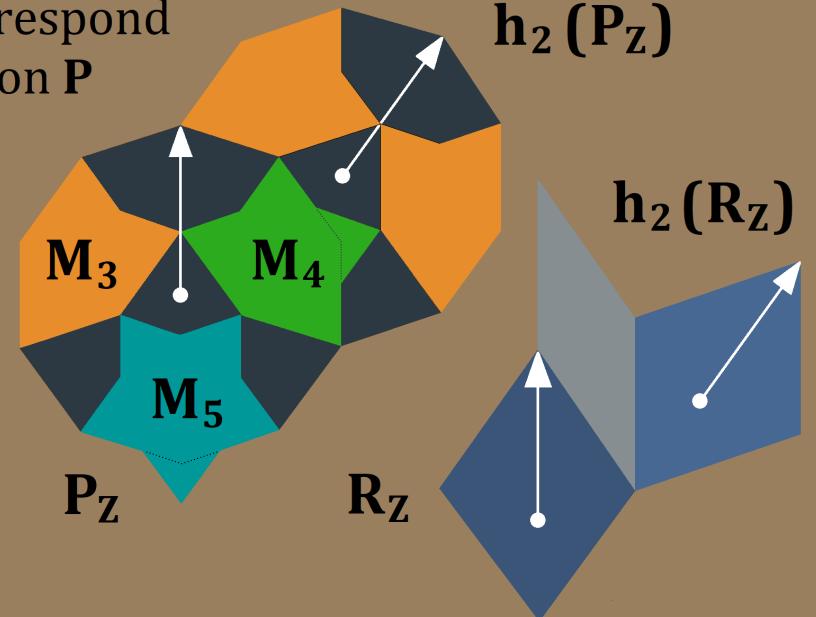




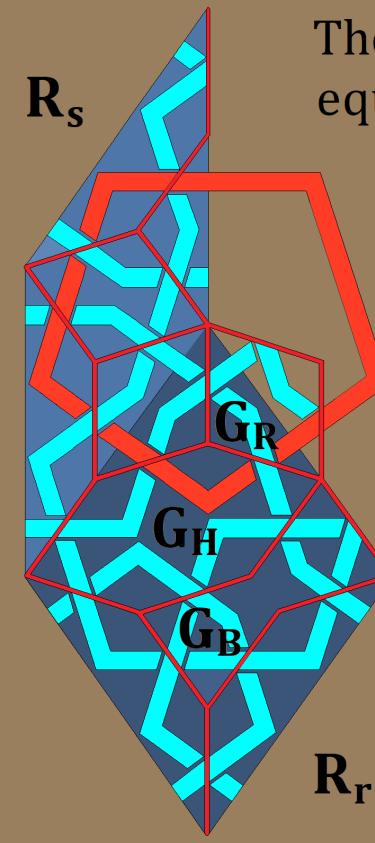
Three closed Girih-knots (yellow, green & blue) correspond to the subsets M_3 , M_4 and M_5 of the Gummelt-deagon P



Three different Girih tiles, G_R , G_H and G_B , are fitted into the fat and the skinny Penrose rhombi R_r and R_s



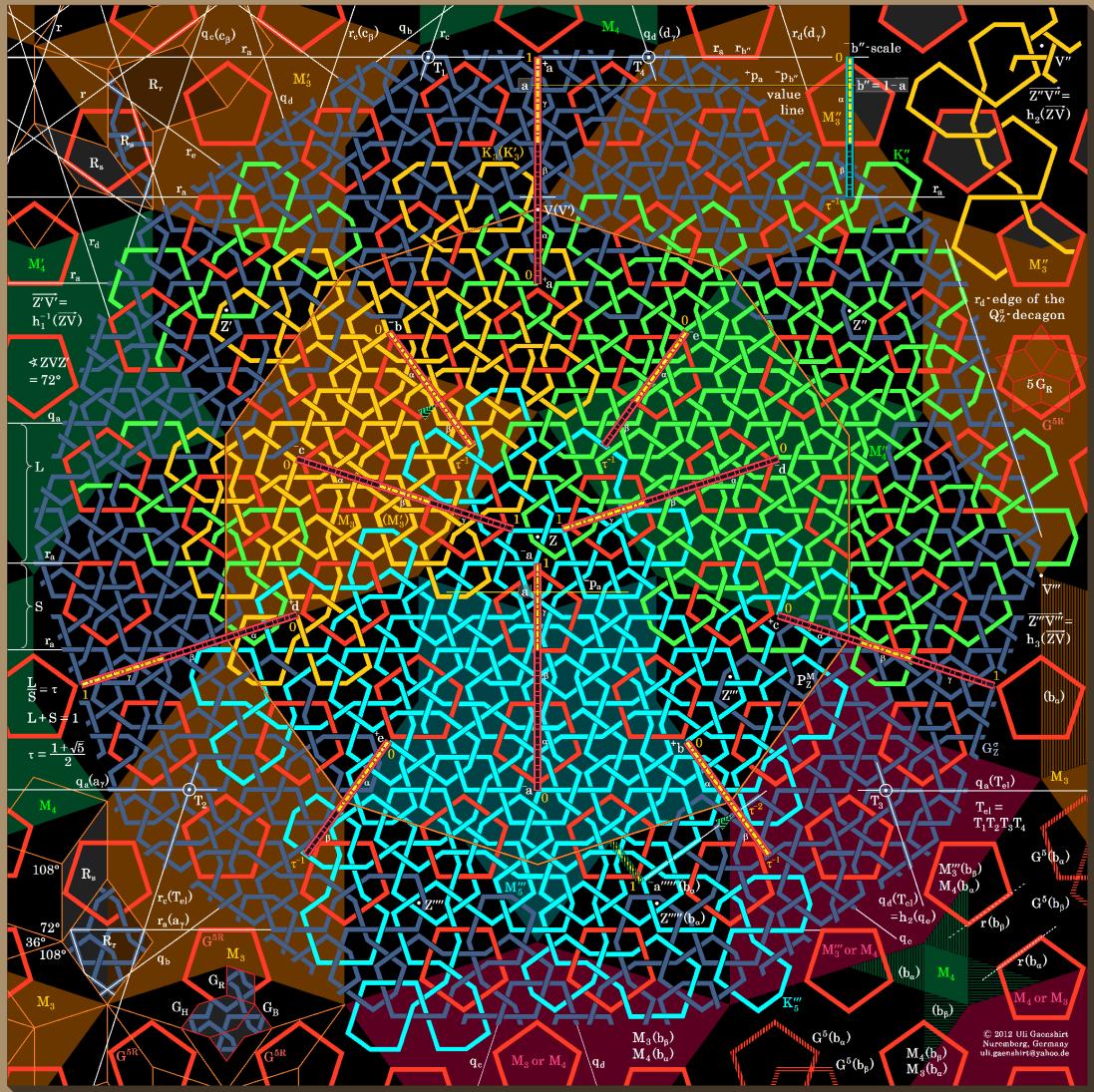
The decagon P has an equivalent relation to the thick rhombus R



Note: R_Z is $4.236\dots (= \tau^3)$ times larger than R_r

G_{Rhombus}
 G_{Hexagon}
 G_{Bowtie}

Like the decagones **P**, the quasi-cells **Q** have an equivalence relationship to the rhombi **R**. The quasi-cells **Q** are controlled by scale values to avoid misalignment.



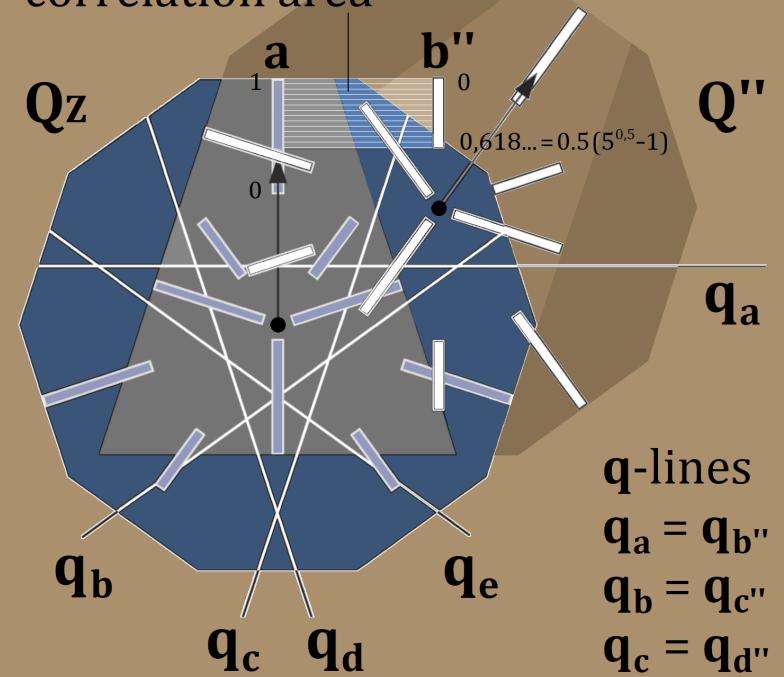
With the Succession Algorithm, the neighbourhoods of each quasi-cell will be calculated by 50 equations.

The values of parallel scales are correlated by equations:

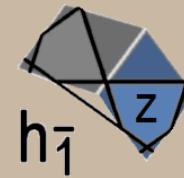
E. g.: $b'' = 1 - a$

a is a value of the a-scale of Q_z
b'' is a scale value of $Q'' = h_2(Q_z)$

correlation area



$a_{0...z\bar{1}} = 1 - d_{0...z}$	\in
$b_{0...z\bar{1}} = e_{0...z}$	\in
$c_{0...z\bar{1}} = 1 - a_{0...z}$	\in
$d_{0...z\bar{1}} = \tau^{-1} - b_{0...z}$	\in
$e_{0...z\bar{1}} = \tau^{-1} - c_{0...z}$	\in



$a_{0...z\bar{4}} = \tau^{-1} - b_{0...z}$	\in
$b_{0...z\bar{4}} = -\tau^{-1} + c_{0...z}$	\notin
$c_{0...z\bar{4}} = 1 - d_{0...z}$	\in
$d_{0...z\bar{4}} = e_{0...z}$	\in
$e_{0...z\bar{4}} = 1 - a_{0...z}$	\in

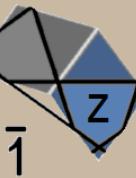


$a_{0...z\bar{3}} = \tau - c_{0...z}$	\notin
$b_{0...z\bar{3}} = 1 - d_{0...z}$	\in
$c_{0...z\bar{3}} = 1 - e_{0...z}$	\in
$d_{0...z\bar{3}} = \tau - a_{0...z}$	\in
$e_{0...z\bar{3}} = b_{0...z}$	\in



$a_{0...z\bar{2}} = 1 - b_{0...z}$	\in
$b_{0...z\bar{2}} = c_{0...z}$	\in
$c_{0...z\bar{2}} = 1 - d_{0...z}$	\in
$d_{0...z\bar{2}} = \tau^{-1} + e_{0...z}$	\notin
$e_{0...z\bar{2}} = \tau^{-1} - a_{0...z}$	\notin

$h_{\bar{2}}$

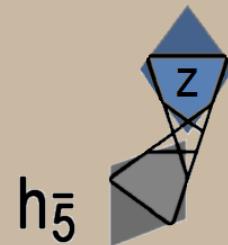


$$t(Q_{0...z}) = T(\text{True})$$

$0,618... < a_z < 1$	$\in a^{\text{def}}$
$0 < b_z < 0,618...$	$\in b^{\text{def}}$
$0,381... < c_z < 0,618...$	$\in c^{\text{def}}$
$0,618... < d_z < 1$	$\in d^{\text{def}}$
$0 < e_z < 0,381...$	$\in e^{\text{def}}$

$$\begin{aligned} 0 < a^{\text{def}} (c^{\text{def}}, d^{\text{def}}) < 1 \\ 0 < b^{\text{def}} (e^{\text{def}}) < \tau^{-1} = 0,618... \end{aligned}$$

$i(z), j \in \{\bar{1}, \bar{4}, \bar{3}, \bar{2}, \bar{5}, 5, 4, 3, 2, 1\}$	
j	$\bar{1} \quad \bar{4} \quad \bar{3} \quad \bar{2} \quad \bar{5} \quad 5 \quad 4 \quad 3 \quad 2 \quad 1$
t _j	T F F F T T F F T T F



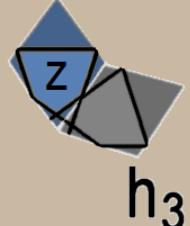
$h_{\bar{5}}$



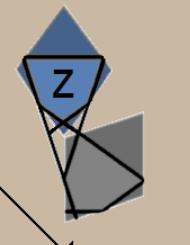
$a_{0...z1} = 1 - c_{0...z}$	\in
$b_{0...z1} = \tau^{-1} - d_{0...z}$	\notin
$c_{0...z1} = \tau^{-1} - e_{0...z}$	\in
$d_{0...z1} = 1 - a_{0...z}$	\in
$e_{0...z1} = b_{0...z}$	\in



$a_{0...z2} = \tau^{-1} - e_{0...z}$	\in
$b_{0...z2} = 1 - a_{0...z}$	\in
$c_{0...z2} = b_{0...z}$	\in
$d_{0...z2} = 1 - c_{0...z}$	\in
$e_{0...z2} = -\tau^{-1} + d_{0...z}$	\in

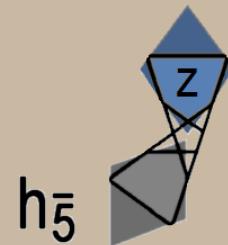


$a_{0...z3} = \tau - d_{0...z}$	\in
$b_{0...z3} = e_{0...z}$	\in
$c_{0...z3} = \tau - a_{0...z}$	\in
$d_{0...z3} = 1 - b_{0...z}$	\in
$e_{0...z3} = 1 - c_{0...z}$	\in



h_4

$a_{0...z\bar{5}} = \tau^{-1} + e_{0...z}$	\in
$b_{0...z\bar{5}} = -\tau^{-1} + a_{0...z}$	\in
$c_{0...z\bar{5}} = 1 - b_{0...z}$	\in
$d_{0...z\bar{5}} = c_{0...z}$	\in
$e_{0...z\bar{5}} = 1 - d_{0...z}$	\in

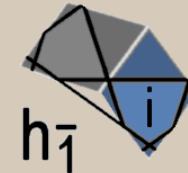


$h_{\bar{5}}$

$a_{0...z5} = \tau^{-1} + b_{0...z}$	
$b_{0...z5} = 1 - c_{0...z}$	\in
$c_{0...z5} = d_{0...z}$	\in
$d_{0...z5} = 1 - e_{0...z}$	\in
$e_{0...z5} = -\tau^{-1} + a_{0...z}$	\in

$a_{0...z4} = 1 - e_{0...z}$	\in
$b_{0...z4} = \tau^{-1} - a_{0...z}$	\notin
$c_{0...z4} = \tau^{-1} + b_{0...z}$	
$d_{0...z4} = 1 - c_{0...z}$	\in
$e_{0...z4} = d_{0...z}$	\notin

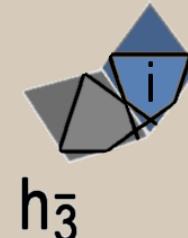
$a_{0...i\bar{1}} = 1 - d_{0...i}$	\in
$b_{0...i\bar{1}} = e_{0...i}$	\in
$c_{0...i\bar{1}} = 1 - a_{0...i}$	\in
$d_{0...i\bar{1}} = \tau^{-1} - b_{0...i}$	\in
$e_{0...i\bar{1}} = \tau^{-1} - c_{0...i}$	



$a_{0...i\bar{4}} = \tau^{-1} - b_{0...i}$	\in
$b_{0...i\bar{4}} = -\tau^{-1} + c_{0...i}$	
$c_{0...i\bar{4}} = 1 - d_{0...i}$	\in
$d_{0...i\bar{4}} = e_{0...i}$	\in
$e_{0...i\bar{4}} = 1 - a_{0...i}$	



$a_{0...i\bar{3}} = \tau - c_{0...i}$	
$b_{0...i\bar{3}} = 1 - d_{0...i}$	
$c_{0...i\bar{3}} = 1 - e_{0...i}$	\in
$d_{0...i\bar{3}} = \tau - a_{0...i}$	
$e_{0...i\bar{3}} = b_{0...i}$	\in



$a_{0...i\bar{2}} = 1 - b_{0...i}$	\in
$b_{0...i\bar{2}} = c_{0...i}$	
$c_{0...i\bar{2}} = 1 - d_{0...i}$	\in
$d_{0...i\bar{2}} = \tau^{-1} + e_{0...i}$	
$e_{0...i\bar{2}} = \tau^{-1} - a_{0...i}$	

$h_{\bar{2}}$



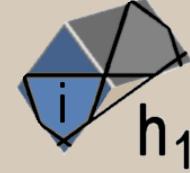
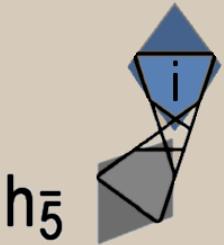
$$t(Q_{0...i}) = T(\text{True})$$

$a_{0...i} =$	\in	a^{def}
$b_{0...i} =$	\in	b^{def}
$c_{0...i} =$	\in	c^{def}
$d_{0...i} =$	\in	d^{def}
$e_{0...i} =$	\in	e^{def}

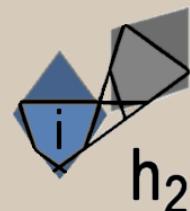
$$0 < a^{\text{def}} (c^{\text{def}}, d^{\text{def}}) < 1$$

$$0 < b^{\text{def}} (e^{\text{def}}) < \tau^{-1} = 0,618\dots$$

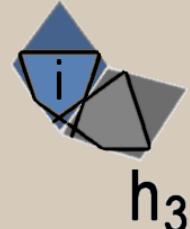
$i, j \in \{\bar{1}, \bar{4}, \bar{3}, \bar{2}, \bar{5}, 5, 4, 3, 2, 1\}$	
j	1 4 3 2 5 5 4 3 2 1
t _j	



$a_{0...i1} = 1 - c_{0...i}$	\in
$b_{0...i1} = \tau^{-1} - d_{0...i}$	
$c_{0...i1} = \tau^{-1} - e_{0...i}$	\in
$d_{0...i1} = 1 - a_{0...i}$	\in
$e_{0...i1} = b_{0...i}$	\in



$a_{0...i2} = \tau^{-1} - e_{0...i}$	\in
$b_{0...i2} = 1 - a_{0...i}$	
$c_{0...i2} = b_{0...i}$	\in
$d_{0...i2} = 1 - c_{0...i}$	\in
$e_{0...i2} = -\tau^{-1} + d_{0...i}$	



$a_{0...i3} = \tau - d_{0...i}$	
$b_{0...i3} = e_{0...i}$	\in
$c_{0...i3} = \tau - a_{0...i}$	
$d_{0...i3} = 1 - b_{0...i}$	\in
$e_{0...i3} = 1 - c_{0...i}$	

h_4



$a_{0...i\bar{5}} = \tau^{-1} + e_{0...i}$	
$b_{0...i\bar{5}} = -\tau^{-1} + a_{0...i}$	
$c_{0...i\bar{5}} = 1 - b_{0...i}$	\in
$d_{0...i\bar{5}} = c_{0...i}$	\in
$e_{0...i\bar{5}} = 1 - d_{0...i}$	

$a_{0...i5} = \tau^{-1} + b_{0...i}$	
$b_{0...i5} = 1 - c_{0...i}$	
$c_{0...i5} = d_{0...i}$	\in
$d_{0...i5} = 1 - e_{0...i}$	\in
$e_{0...i5} = -\tau^{-1} + a_{0...i}$	

$a_{0...i4} = 1 - e_{0...i}$	\in
$b_{0...i4} = \tau^{-1} - a_{0...i}$	
$c_{0...i4} = \tau^{-1} + b_{0...i}$	
$d_{0...i4} = 1 - c_{0...i}$	\in
$e_{0...i4} = d_{0...i}$	