

Quaternion Symmetry Inherent to the Icositetragon

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ABSTRACT

When integers are continuously plotted around each side of an icositetragon (24-sided polygon), quaternion sets are demonstrated, allowing the identification of charge-associated quadripolarity.

SUMMARY

Each integer along the perimeter sides of an icositetragon possesses symmetrical relationships with a set of three other integers. These groups of four integers can be represented by quaternions, related through patterns termed as “quadripolar.” Quaternions take the form of $w + xi + yl + zk$, where w , x , y , and z are integers from the icositetragon and i , l , and k are transformation functions. Numbers that add together to 360 (or multiples of 360) are considered “circular complements” and are therefore parts of the same quaternion integer set. Quaternion parts can also be divided by the whole (360) to obtain decimal references to the numbers in the icositetragon array.

For example, one circular complement of 341 is 19, found in the mirrored opposite modulus and cycle position when reflecting across the Y-axis or vertical moduli (24 and 12). The 2 additional complements, 161 and 199, are “refracted” through the horizontal moduli or X-axis (6 and 18). Plotting these numbers onto a unit circle unifies the degree and decimal references (See Figure 2). In addition, complementary and sometimes palindromic relationships exist between quaternion angles and decimal references (See Figure 3). All icositetragon integers, and their references, retain ‘self-organizing’ complementarity and symmetrical relationships infinitum (See Figure 6).

Prime modulus numbers (integers belonging to modulus 1, 5, 7, 11, 13, 17, 19, and 23) “refract” through the “central” 4 moduli (24, 6, 12, and 18 or North, East, South, and West). The “central” modulus numbers possess complementary and symmetrical relationships with numbers *within* the same modulus (See Figure 8), with numbers in other central moduli (See Figures 4-5), as well as with numbers belonging to the prime moduli (See Figure 7). The combined understanding of these patterns and their quaternion relationships is collectively defined as “quadripolar/quadripolarity of charge,” where numerical identity is shared through quaternion sets.

RESULTS

Circular complementarity is demonstrated between one pair of mirrored integers that sum to 360 (degrees) and quaternion “quadripolarity” is associated between two pairs of circular complements (summing to 720 degrees) (See Figure 8). Therefore, groups of four (4) numbers can be represented by a quaternion set, whereby form $Q = w + xi + yl + zk$. Partial angle (w) is shared between each quaternion value in relation to the X and Y-axes, which is the result of quadripolar symmetry. In an integer set expanding to 360, there are a total of 89 unique quaternion sets (Q’s), constructed by the following algorithm for any given icositetragon integer represented by A:

If $A > 90$, set $A = A - 90$. If $A < 90$, set $A = w$, $180 - A = xi$, $180 + A = yl$, and $360 - A = zk$. (Numbers 0/360, 90, 180 and 270 would form a final hypothetical (90th) quaternion)

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Figure 1 shows a quaternion grouping based on $w = x = y = z$. The aggregate quaternion Q will always equal 720 (360×2), or 2 or cancel out to 0 for the decimal references when applying charge polarity.

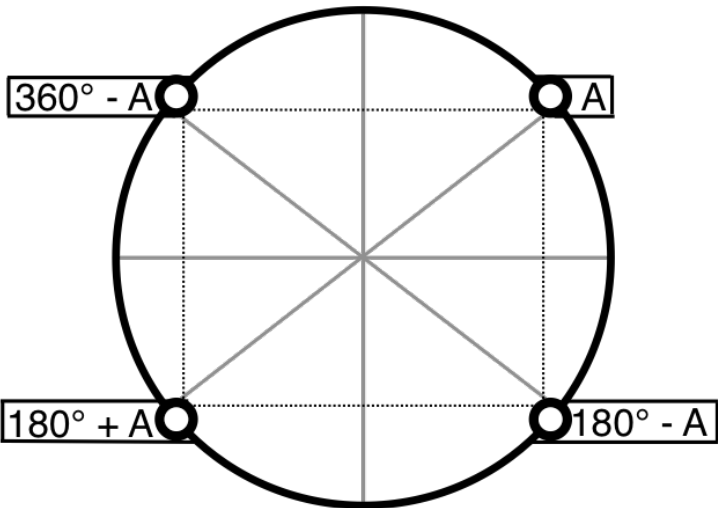


Figure 1

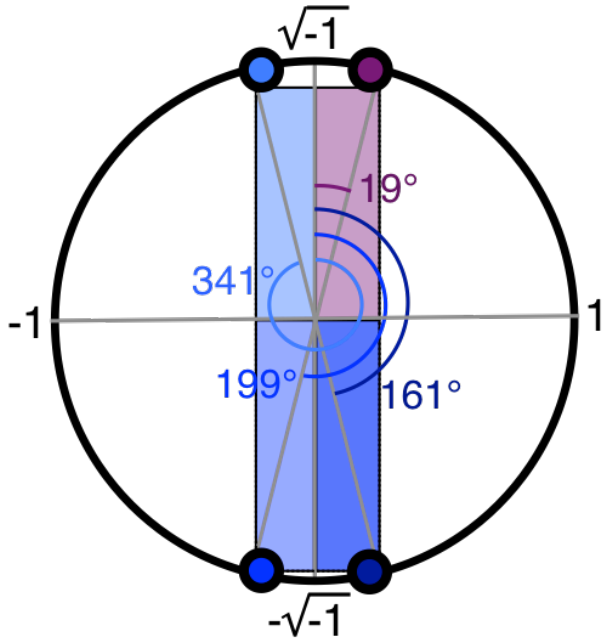
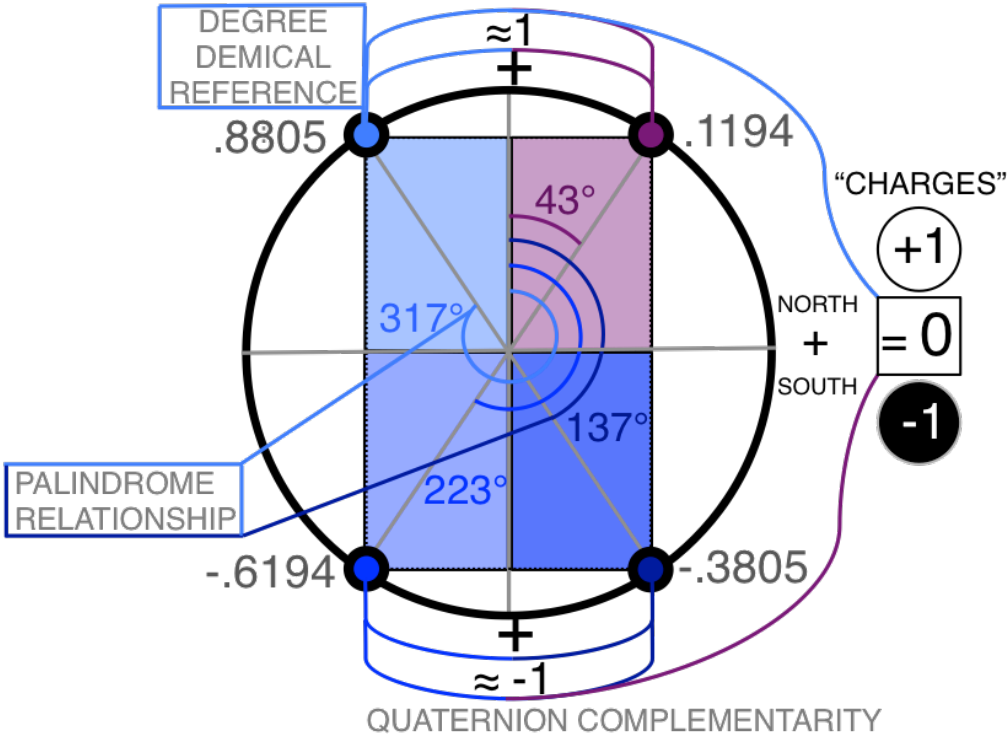


Figure 2

These results suggest additional emergent symmetries between specific integers that possess natural palindromic relationships in mirrored quaternion symmetry. Additionally, quaternion summation of integers implies “charge polarities” of -1 , $+1$, $\sqrt{-1}$, and $-\sqrt{-1}$, crossing both East/West and North/South charge polarities, returning the aggregate quaternion sum back to a theoretical zero point (or 360 degrees or 1 rotation).

Figure 3



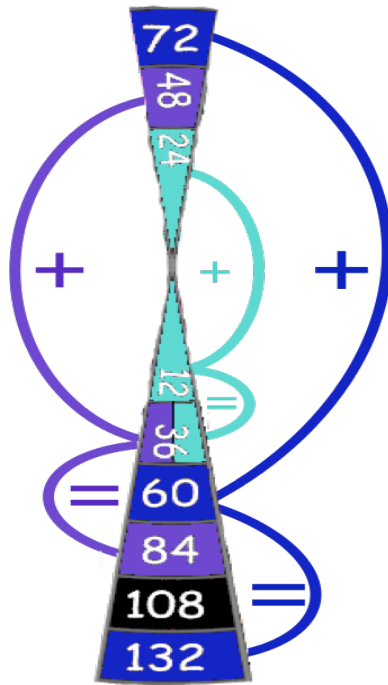


Figure 4

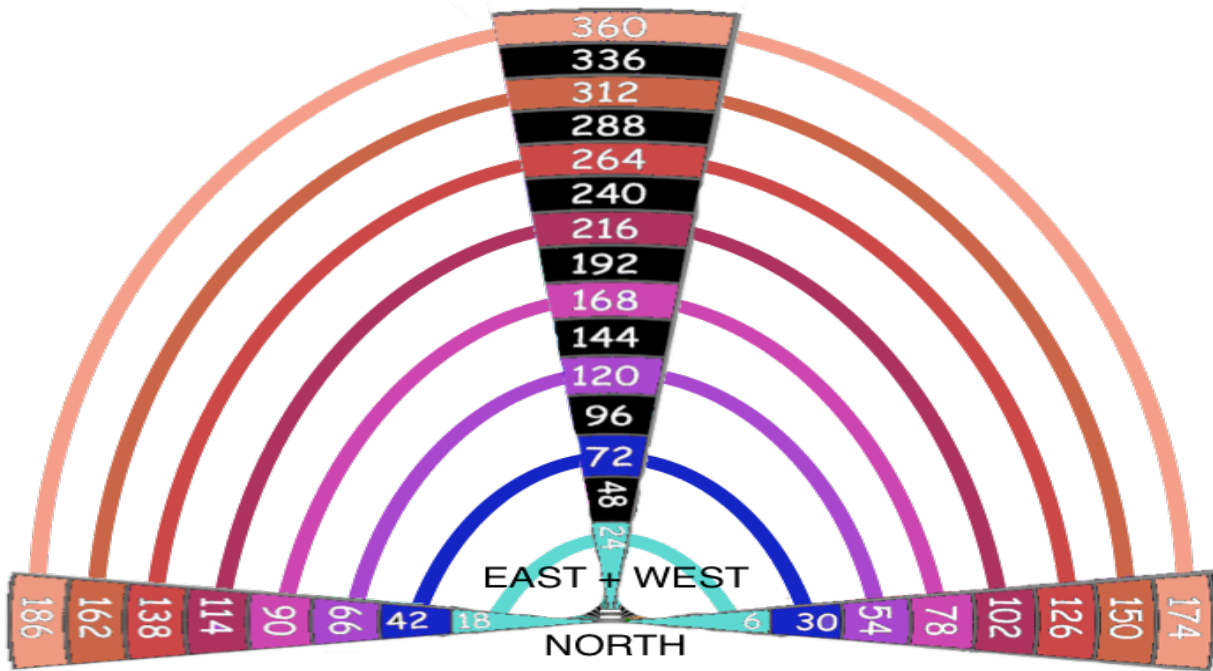


Figure 5

Symmetry of complementarity between central modulus integers is also associated with the icositetragonal geometry. Figure 4 illustrates this symmetry between the North and South moduli and Figure 5 demonstrates a novel pattern where East and West modulus numbers sum to every other corresponding North modulus number.

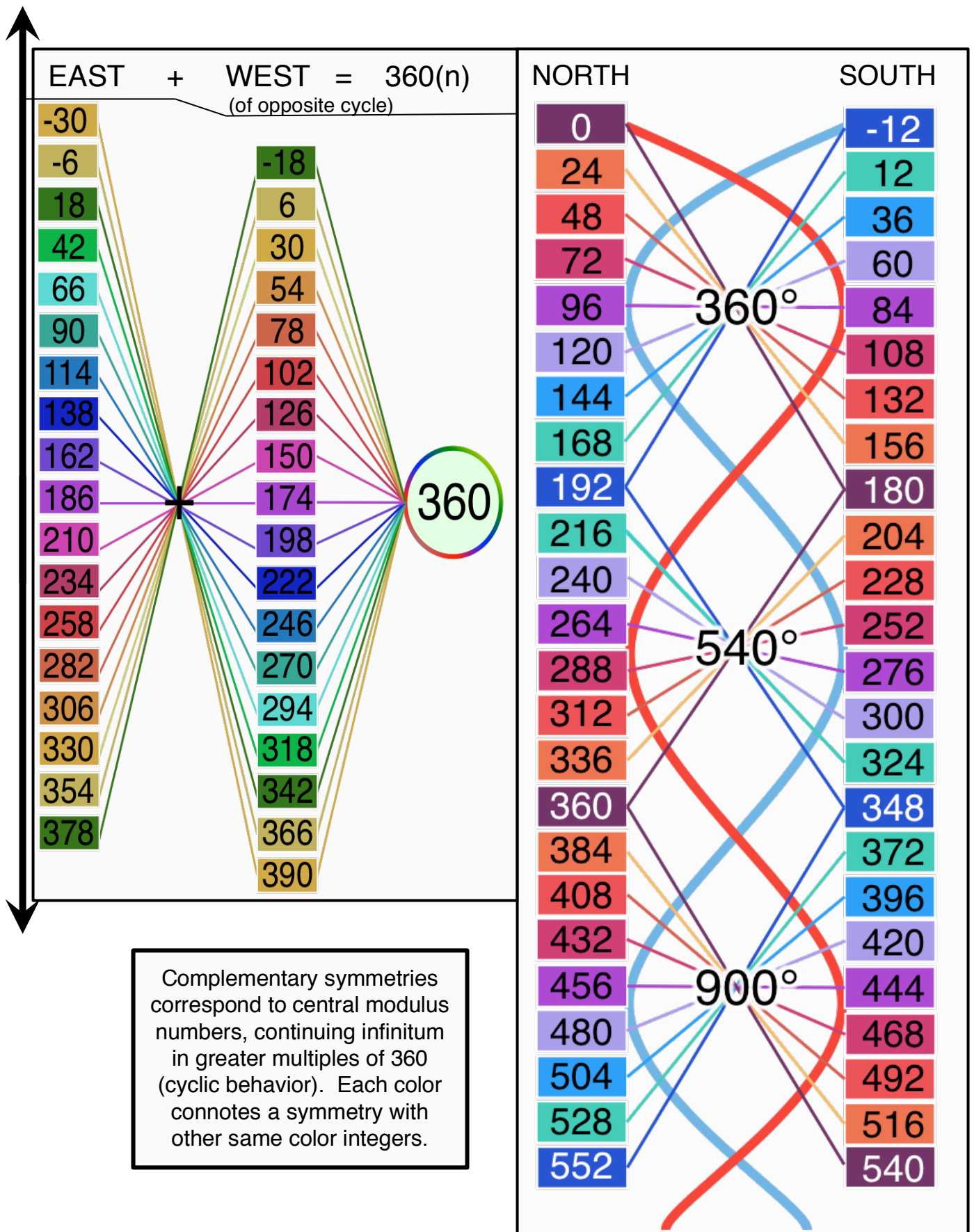


Figure 6

$12 = 5 + 7$
 $24 = 13 + 11$
 $24 = 23 + 1$
 $36 = 19 + 17$
 $60 = 29 + 31$
 $60 = 25 + 35$
 $66 = 31 + 35$
 $66 = 29 + 37$
 $72 = 47 + 25$
 $72 = 37 + 35$
 $78 = 41 + 37$
 $78 = 43 + 35$
 $84 = 47 + 37$
 $84 = 43 + 41$
 $108 = 53 + 55$
 $108 = 49 + 59$
 $114 = 55 + 59$
 $114 = 53 + 61$
 $126 = 65 + 61$
 $126 = 67 + 59$
 $120 = 61 + 59$
 $120 = 71 + 49$
 $132 = 67 + 65$
 $132 = 71 + 61$
 $156 = 73 + 85$
 $156 = 77 + 79$
 $168 = 85 + 83$
 $168 = 95 + 73$
 $180 = 95 + 85$
 $180 = 91 + 89$

Table 1

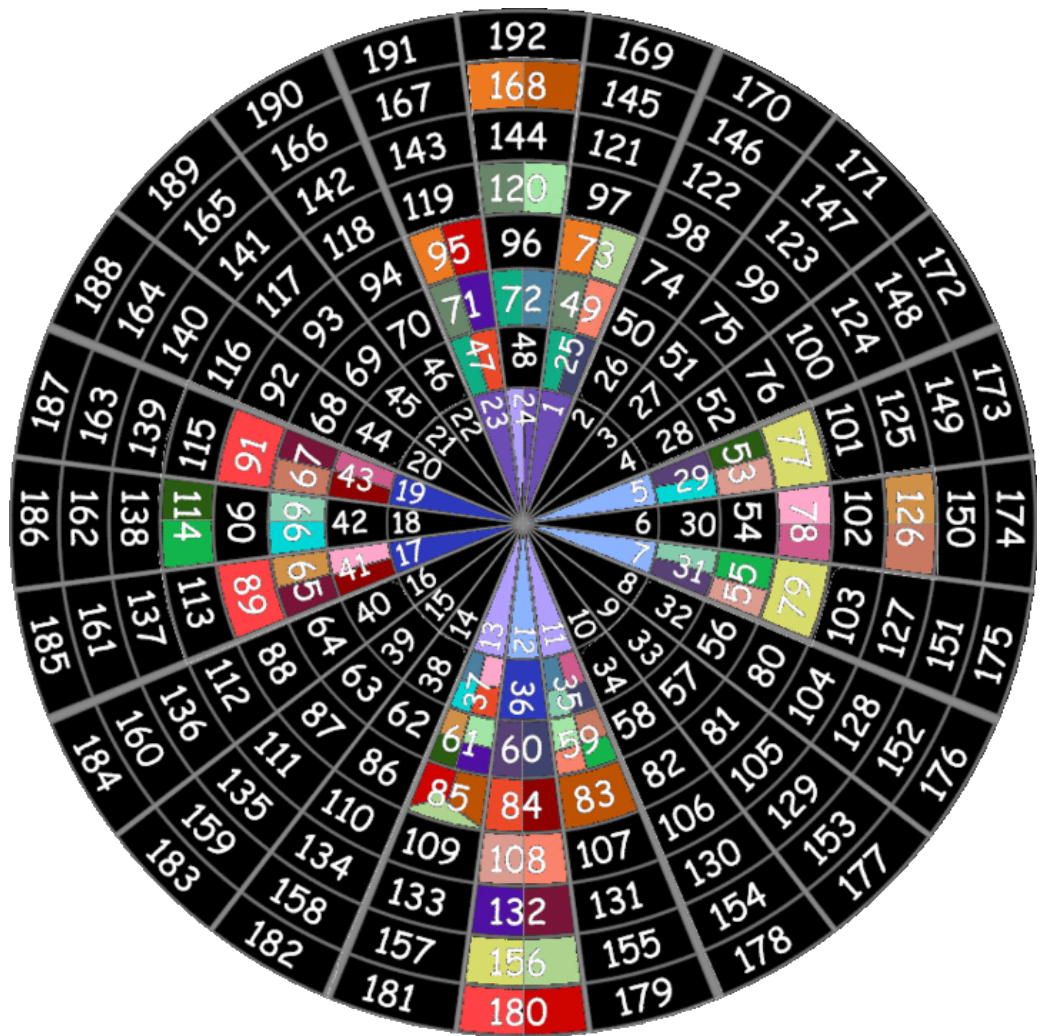


Figure 7

Color coordination shows the complementary, symmetrical relationship between two prime modulus numbers and one central modulus number.

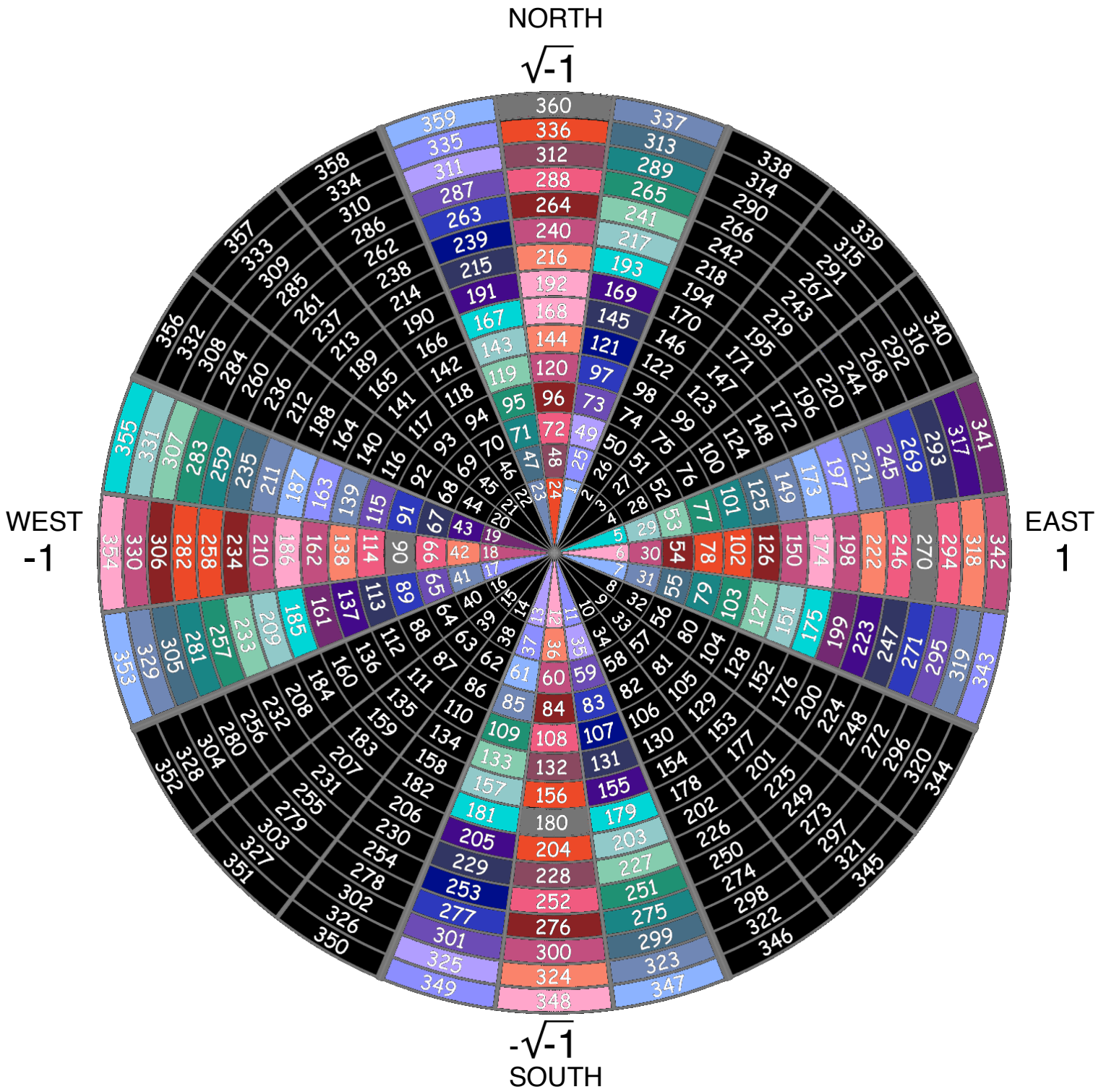


Figure 8

Quaternion groups are all demonstrated by color coordination. Integers 0/360, 90,180, 270 belong to a unique group, representing the points of reflection for symmetries that occur within each central modulus (North, East, South, and West).

The use of quaternions simply represents the groups of icositetragon integers, or “quadripoles,” mathematically. It is important to note that other clock-organizations or geometries possess *some* of these patterns, but the 24hr-clock shows *all* symmetrical relationships.

CONCLUSION

Recently proven patterns, inherent to the icositetragon geometry, involve prime numbers, quasi-primes and primes^2 , all of which neatly organize infinitum within the specified, 8, prime moduli (See References). After conducting further research, it is noted that each specific integer belongs to a self-organizing symmetry represented by the quaternion groups of four discrete charge polarities which in summation revert back to zero. More research is required to identify what further relationships may exist between prime numbers, q-primes and primes^2 and other integers and transcendental numbers (mathematical and physics constants) following identification through their degree and decimal references.

REFERENCES

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- [2] Grant, Robert E. M.B.A. “Prime Number Determinacy and Prediction.” *Internet Archive*. Web. 12 June 2018.

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