Symmetry Competition and the Twins Paradox

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Despite the delightful perfection of symmetries expressed in symbols, their history-constrained equivalents in the physical world are necessarily finite, localized, approximate, and (subtly, but importantly) constrained by lightspeed. Since the symbolic symmetry groups of mathematics assume no such limits, any symmetry we observe in the physical universe is, at best, incomplete. It is the difference between an infinite wave in an infinite space and a real wave on a pond.

Due to their need for energy and time to complete, real-universe examples of symmetries engage in what might best be considered turf wars.

Special relativity is a lovely example of how these turf wars directly impact everyday physics. When groups of similarly moving particles share enough additional (and severe) geometric constraints, they create local instances of the metrics we call "space" and "time." These local-only examples of space and time are not trivial things since, through quantum field theory, they extend down to the particle level.

Alas, the universe won the big spacetime-definition turf war billions of years ago. That is why the clocks of the accelerated twin in the Twins Paradox always run slower than the clocks of the twin who stayed home.