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Failure to Accept the Diversity of Time's Relationship with Space using Quaternions DOUGLAS SWEETSER, CTO quaternions.com — Newton, Gauss, Hamilton, Maxwell, Einstein, and Dirac all carefully considered time's relationship to space. Newton denied there was a relationship between absolute time and space even while exploiting velocity and acceleration. Gauss determined the algebra for quaternions but only published work on differential geometry and metrics. The day after Hamilton discovered the algebra for multiplying quaternions, he set the real number scalar to zero (called a pure quaternion). He was the first to write down a Lorentz invariant interval 10 years before Lorentz was born but didn't appreciate the result. Despite conspiracy theories to the contrary, Maxwell's first edition of his treatise use only pure quaternions. When Einstein asked his math buddy Marcel Grossmann to generalize an interval, Grossman reluctantly introduced Einstein to the complexity of Riemann geometry instead of squaring a quaternion. The work of Josiah Gibbs to separate quaternion products into component parts was so successful that Dirac reinvented a variant on quaternion algebra. In 2019, there was a blog that said quaternion quantum mechanics was a complete dumpster fire. Please stop by and share your perspective on space, time, energy, momentum, and the mysteries of modern physics left by the masters.

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