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Traveling at the Speed of Thought: Proving the Existence of Gravitational Waves

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Gravitational Waves represent a nearly unique instance of unfinished business in the history of modern physics. One of the slew of novel concepts which arose in the revolutionary period of the early 20th century, they retained their place in the new physics for nearly a century in the total absence of any kind of experimental confirmation. It was only natural, therefore, that their theoretical development was marked by repeated debate over whether they really existed, or played any kind of role in astrophysical systems such as binary stars. The course of these controversies (including the quadrupole formula controversy) is briefly recounted, and it is argued that both confidence in and skepticism of their existence were nourished by the nature of the analogy with electromagnetic waves which enabled their conceptualization in the first place.