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Eguchi-Hanson Spacetime: Gravitational Instantons, Physical Interpretation, and Quantum Gravity Measurements

Instantons are Euclidean solutions of the Yang-Mills equations of motion, whose existence has been fundamental for the study of quantum chromodynamics. These solutions allow us to explore quantum tunneling and vacuum transitions in gauge theories. In 1978, Eguchi and Hanson proposed a particular type of spacetime, which introduced a new way of interpreting instantons in a gravitational context. This development has opened the door for the study of quantum effects in gravity and has become an important step in the formulation of modern theories of quantum gravity. An approach to the physical interpretation of the results of gravitational instanton theory using general relativity and quantum mechanical techniques will be presented.

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