

A Paradox and its Resolution Illustrate Principles of de Sitter Holography

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Semiclassical gravity and the holographic description of the static patch of de Sitter space appear to disagree about properties of correlation functions. Certain holographic correlation functions are necessarily real whereas their semiclassical counterparts have both real and imaginary parts. The resolution of this apparent contradiction involves the fact that time-reversal is a gauge symmetry in de Sitter space—a point made by Harlow and Ooguri—and the need for an observer (or quantum reference frame) as advocated by Chandrasekaran, Longo, Penington, and Witten.

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