

Theories of Quantum and Analog Gravity represented in the Mandelbrot Set

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Abstract

The Mandelbrot Set displays features of the 5-d \rightarrow 4-d transition in DGP gravity and in theories where a 5-d black hole gives rise to a 4-d white hole and spacetime bubble – which is our present-day cosmos – at $(-0.75, 0i)$. The ratio of radii here is 3:1 in imitation of Cartan's rolling ball analogy for Lie group G_2 symmetries. Holographic dualities are displayed across the boundary, linking the quantum mechanics in the precursor universe with the astrophysical realm in the current era, which we discuss. Then we examine the Misiurewicz point at about $(-1.543689, 0i)$ where is clearly depicted an analogy of BEC formation and Schwarzschild black hole event horizons, which forms an important part of the analog gravity program. The fact both of these dynamics are displayed in the same object indicates that the theories are not mutually-exclusive and could coexist in nature.

Keywords: AdS/CFT, 5-d \rightarrow 4-d, Lie group G_2 , Mandelbrot Set, BEC analog gravity