

# Massive Gravity Illustrated in the Mandelbrot Set

Jonathan J. Dickau  
*Independent Researcher/Science Writer*

## Abstract

The long-range transition to 5-d or higher, seen in DGP gravity, cascading DGP, and some other theories, can be interpreted as a prior epoch or precursor universe. This transition has therefore been proposed to be a black hole in 5-d  $\rightarrow$  4-d white hole and a spacetime bubble that is our cosmos. The same transition is represented in the Mandelbrot Set at  $(-0.75,0i)$ , where the cardioid meets the circular disc, mimicking Cartan's rolling ball analogy for  $G_2$  symmetries – when  $\mathcal{M}$  is extended into higher dimensions. We can therefore study this in an archetypical setting, and it suggests a unique exit from a higher-dimensional origin, which conveniently explains the weakness of gravity and accelerating expansion. Other analogies allow us to discuss graviton properties and phenomenology. Notably the Misiurewicz point at about  $(-1.543689,0i)$  represents the quantum critical point in BEC formation, which has been connected to black hole event horizons. A consistent model for gravity with higher-dimensional origins is offered.

Keywords: Massive gravity, Lie group  $G_2$ , Mandelbrot Set, higher-d origin, graviton