

# **SPATIAL-TEMPORAL DYNAMICS OF WORMHOLES IN A BRANEWORLD MODEL**

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## **ABSTRACT**

The dynamic wormhole models that were previously introduced focused on the dynamics of the wormhole itself of either rotating or evolutionary in characteristics and in various frameworks. In this study we show the dynamic factor that represents the spatial dynamics in terms of spacetime expansion and contraction in braneworld cosmology framework affects the changes at the throat of the wormhole by either decreasing or increasing the stress energy tensor respectively. This implies an interesting finding concerning the effects of cosmological expansion and contraction of the universe or in general the surrounding space of wormholes that is expanding or contracting from and toward the wormholes respectively. Furthermore, the gravitational lens of a wormhole was also introduced by various researchers. Their treatment was focused basically on the lens signature that describes wormhole geometrical character such as the differences from a black hole or between any various types of wormhole models. The braneworld scenario provides the idea of spacetime with underlying extra-dimensions. The inclusion of extra-dimensional terms in the gravitational lens object spacetime line element will result in some variation in the expression for its gravitational lens deflection angle. In this study we investigate such variation by deriving this deflection angle expression. Thus this study not only shows the existence of such variation but also suggests the potential utilization of gravitational lensing to prove the existence of extra dimensions by studying the deflection angle characteristic in accordance with the spacetime expansion rate of the universe.

**Keywords:** General Relativity, Brane, Gravitational Lens, Wormhole.