

domains and tends ultimately to disappear completely. For smaller \tilde{a}_0 bounds we obtain fluctuations in $\tilde{V}''(\tilde{a})$, which is smooth otherwise.

In each plot it is observed that the maximum of $\tilde{V}''(\tilde{a})$ occurs at the right-below corner (say, at a_{\max}) which decreases to the left (with \tilde{a}_0) and in the upward direction (with β). Beyond certain limit (say a_{\min}), the region of instability takes the start. The proper time domain of stability can be computed from (35) as

$$\Delta\tau = \int_{a_{\min}}^{a_{\max}} \frac{d\tilde{a}}{\sqrt{-V(\tilde{a})}}. \quad (46)$$

From a distant observer's point of view the timespan Δt can be found by using the radial geodesics Lagrangian which admits the energy integral

$$f\left(\frac{dt}{d\tau}\right) = E_o = \text{const}. \quad (47)$$

This gives the lifetime of each stability region determined by

$$\Delta t = \frac{1}{E_o} \int_{a_{\min}}^{a_{\max}} \frac{d\tilde{a}}{f(\tilde{a}) \sqrt{-V(\tilde{a})}}. \quad (48)$$

Once a_{\min} (a_{\max}) are found numerically, assuming that no zeros of $f(\tilde{a})$ and $V(\tilde{a})$ occurs for $a_{\min} < a < a_{\max}$, the lifespan of each stability island can be determined. We must admit that the mathematical complexity discouraged us to search for possible metastable region that may be triggered by employing a semi-classical treatment.

V. CONCLUSION

Our numerical analysis shows that for $\alpha < 0$, and specific ranges of mass and charge the 5D EMGB thin-shell wormholes with normal matter can be made stable against linear, radial perturbations. The fact that for $\alpha > 0$ there is no such wormholes is well-known. The magnitude of α is irrelevant to the stability analysis. This reflects the universality of wormholes in parallel with black holes, i.e., the fact that they arise at each scale. Stable regions develop for each set of finely-tuned parameters which determine the lifespan of each such region. Beyond those regions instability takes the start. Our study concerns entirely the exact EMGB gravity solution given in Ref. [6]. It is our belief that beside EMGB theory in different theories also such stable, normal-matter wormholes are abound, which will be