Review of: "Hamiltonian Chaos and the Fractal Topology of Spacetime (Part 1)"

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Potential competing interests: No potential competing interests to declare.

Review of the paper: Ervin Goldfain's article Hamiltonian Chaos and the Fractal Topology of Spacetime (Part 1)

I believe this is an interesting paper that contains attractive ideas about the possible geometric structure of spacetime. I do have some remarks, however, that I believe will help the author improve the paper:

Additional references:

1. Abstract 2nd line: "This tutorial traces the origins of fractal spacetime…" To get a feeling of what "fractal spacetime" means, it would be good for the author to refer to the book "Fractal Space-Time And Microphysics: Towards A Theory Of Scale Relativity Illustrated Edition by L Nottale (1993).
2. Regarding a "Chaotic Universe" it would be useful for the author to refer to the article "Chaotic universe model", by Ekrem Aydiner, Scientific Reports volume 8 (2018).
3. Regarding the term "foam-like structure, please refer to the paper" Foam-like structure of the Universe, A.A. Kirillov, D. Turaev, Physics Letters B. Volume 656, Issues 1–3, 15 November 2007, Pages 1-8.

General remarks:

1. The purpose of this brief tutorial is well served, as it indeed provides an accessible introduction to Hamiltonian chaos and its phase-space topology.
2. **The Assumptions are well pointed out:** A1) Decoherence of open quantum systems and the transition to classical behavior occurs far above the Fermi scale set by the electroweak vacuum. A2) Strong Hamiltonian chaos is nearly universal, as reflected in the similar phase-space topology of almost all nonlinear systems, including classical gauge and gravitational fields [3].
3. Ref. 6 is too general and does not help the reader. Please isolate the relevant aspects of this Wikipedia page.

Corrections (in bold):

1. "…textbook example of gravitational chaos in **Astronomy** (the Hénon-Heiles model), which has **common features** with the properties of the Standard Map."
2. Eq. (4): Please explain exactly the meaning of a_s in connection with Fig. D.
3. Below (11b): Modify the phrase as pointed out in bold: "phase-space trajectories lie on invariant curves **that stretch**

across the square and the variation in momentum p is restricted (fig. 1). Following the Kolmogorov-Arnold-Moser (KAM) theorem, the last **of these invariant curves** is destroyed when K is ramped up to Kc = 0.971635".
