General Relativity and Quantum Cosmology

A Note on Infinities in Eternal Inflation

George F. R. Ellis, William R. Stoeger

(Submitted on 26 Jan 2010)

In some well-known scenarios of open-universe eternal inflation, developed by Vilenkin and co-workers, a large number of universes nucleate and thermalize within the eternally inflating mega-universe. According to the proposal, each universe nucleates at a point, and therefore the boundary of the nucleated universe is a space-like surface nearly coincident with the future light cone emanating from the point of nucleation, all points of which have the same proper-time. This leads the authors to conclude that at the proper-time $t = t_{nuc}$ at which any such nucleation occurs, an infinite open universe comes into existence. We point out that this is due entirely to the supposition of the nucleation occurring at a single point, which in light of quantum cosmology seems difficult to support. Even an infinitesimal space-like length at the moment of nucleation gives a rather different result -- the boundary of the nucleating universe evolves in proper-time and becomes infinite only in an infinite time. The alleged infinity is never attained at any finite time.

Comments:	13 pages and 6 figures
Subjects:	**General Relativity and Quantum Cosmology (gr-qc)**; Cosmology and Extragalactic Astrophysics (astro-ph.CO)
Journal reference:	Gen.Rel.Grav.41:1475-1484,2009
DOI:	10.1007/s10714-008-0715-4
Cite as:	**arXiv:1001.4590v1 [gr-qc]**

Submission history

Which authors of this paper are endorsers?

Link back to: arXiv, form interface, contact.

Download:

- PostScript
- PDF
- Other formats

Current browse context:
gr-qc
< prev | next >
new | recent | 1001

Change to browse by:

astro-ph
   astro-ph.CO

References & Citations

- SLAC-SPIRES HEP (refers to | cited by)
- NASA ADS
- CiteBase

Bookmark(what is this?)

- CiteULike logo
- Connotea logo
- BibSonomy logo
- Mendeley logo
- Facebook logo
- del.icio.us logo
- Digg logo
- Reddit logo