

# Exotica or the failure of the strong cosmic censorship in four dimensions

Gábor Etesi

*Department of Geometry, Mathematical Institute, Faculty of Science,  
Budapest University of Technology and Economics,  
Egry J. u. 1, H ép., H-1111 Budapest, Hungary \**

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## Abstract

Based on [1] in this talk a generic counterexample to the strong cosmic censor conjecture is exhibited. More precisely—taking into account that the conjecture lacks any precise formulation yet—first we make sense of what one would mean by a “generic counterexample” by introducing the mathematically unambiguous and logically stronger concept of a “robust counterexample”. Then making use of Penrose’ nonlinear graviton construction (i.e., twistor theory) and a Wick rotation trick we construct a smooth Ricci-flat but not flat Lorentzian metric on the largest member of the Gompf–Taubes uncountable radial family of large exotic  $\mathbb{R}^4$ ’s. We observe that this solution of the Lorentzian vacuum Einstein’s equations with vanishing cosmological constant provides us with a sort of counterexample which is weaker than a “robust counterexample” but still reasonable to consider as a “generic counterexample”. It is interesting that this kind of counterexample exists only in four dimensions. Motivated by Gompf’s *exotic ménagerie* construction we also speculate that the existence of this counterexample may reflect the general situation in four dimensions.

## References

- [1] G.Etesi: *Exotica or the failure of the strong cosmic censorship in four dimensions*, preprint, 11 pp., arXiv: 1503.04945 [gr-qc] (2015).

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\*e-mail: etesi@math.bme.hu