

The Data Content of Protons is Only a Few Bits

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https://www.youtube.com/watch?v=WZfmG_h5Oyg&lc=UgyAvITD_gGmDqv8V4AaABAq

Comment on YouTube PBS Space Time post:

What Happens Inside a Proton?

https://youtu.be/WZfmG_h5Oyg?t=49s

0:49 – "... it's impossible to calculate the evolution of all but the [simplest systems of] the quantum world, where the information density is obscenely high." No. Bits leave causal traces and require mass-energies proportional to their certainty. The lattice QCD definition of information does neither. It is more akin to saying a blank 4-bit microprocessor is an artificial intelligence since it becomes one if you add enough real bits and energy.

This misunderstanding traces back to the 1990s when smart folks like Gerard 't Hooft and Leonard Susskind watched emerging computer technology and wrongly assumed bits were simple, almost infinitely cheap, and almost infinitely dense. None of this is true. The actual, physically meaningful information density of rest-state proton is closer to the standard list of its unique quantum numbers. The false information densities of lattice QCD arise from ordinary Planck uncertainty since any precisely orthogonal space lattice at sub-proton scales is almost infinitely energetic.

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PDF: <https://sarxiv.org/apa.2022-08-04.0005.pdf>