« Atelier sur les relations de fluctuation entropique en mathématiques et physique »
29 octobre au 2 novembre 2018

"Workshop on Entropic Fluctuation Relations in Mathematics and Physics"
October 29 - November 2, 2018

StatMech pieces to the dark energy puzzle

Thibaut Demaerel *

thibaut.demaerel@kuleuven.be

An old fine-tuning problem in high energy physics and cosmology concerns the very small but allegedly non-zero dark energy density Λ. In cosmic observations, the presence of Λ becomes noticeable — by causing an accelerated expansion of the universe — precisely at the epoch where the cosmic mass density becomes exceedingly stratified (the epoch of "structure formation"). Consider now that...

1) the aforementioned observed cosmic inhomogeneities are mostly neglected in the standard "ΛCDM" model of cosmology.

2) the value of Λ is of the same order of magnitude as the mass density of the visible "baryonic" mass. That prompts the following question: could a statistical mechanical treatment of cosmic inhomogeneity possibly shed some light on the dark energy problem?

*Institute for Theoretical Physics, KU Leuven, Celestijnenlaan 200d - box 2415, 3001 Leuven, BELGIUM