

Physics bridging the infinities: the largest scales

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I will sketch how we turned cosmology into a fully scientific subject, the physics of the largest scales, and what we now know about the history of the universe.

Then, I will focus on what we do not understand yet about the same history, which has to do both with the current cosmological dynamics at very large scales and with the very beginning of our cosmos.

Concerning the latter issue, the main current scenarios will be introduced, showing that, in fact, to complete the cosmological picture we need to understand better quantum gravity, i.e. the physics of the smallest scales.

Finally, I will report on recent developments suggesting that quantum gravity may actually be responsible also for the puzzling features of the very largest scales and that the very ideas of space and time (and thus, scales) may be emergent and not fundamental.

Some conceptual issues that have to be faced in pursuing scientific cosmology will also be highlighted.

References

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