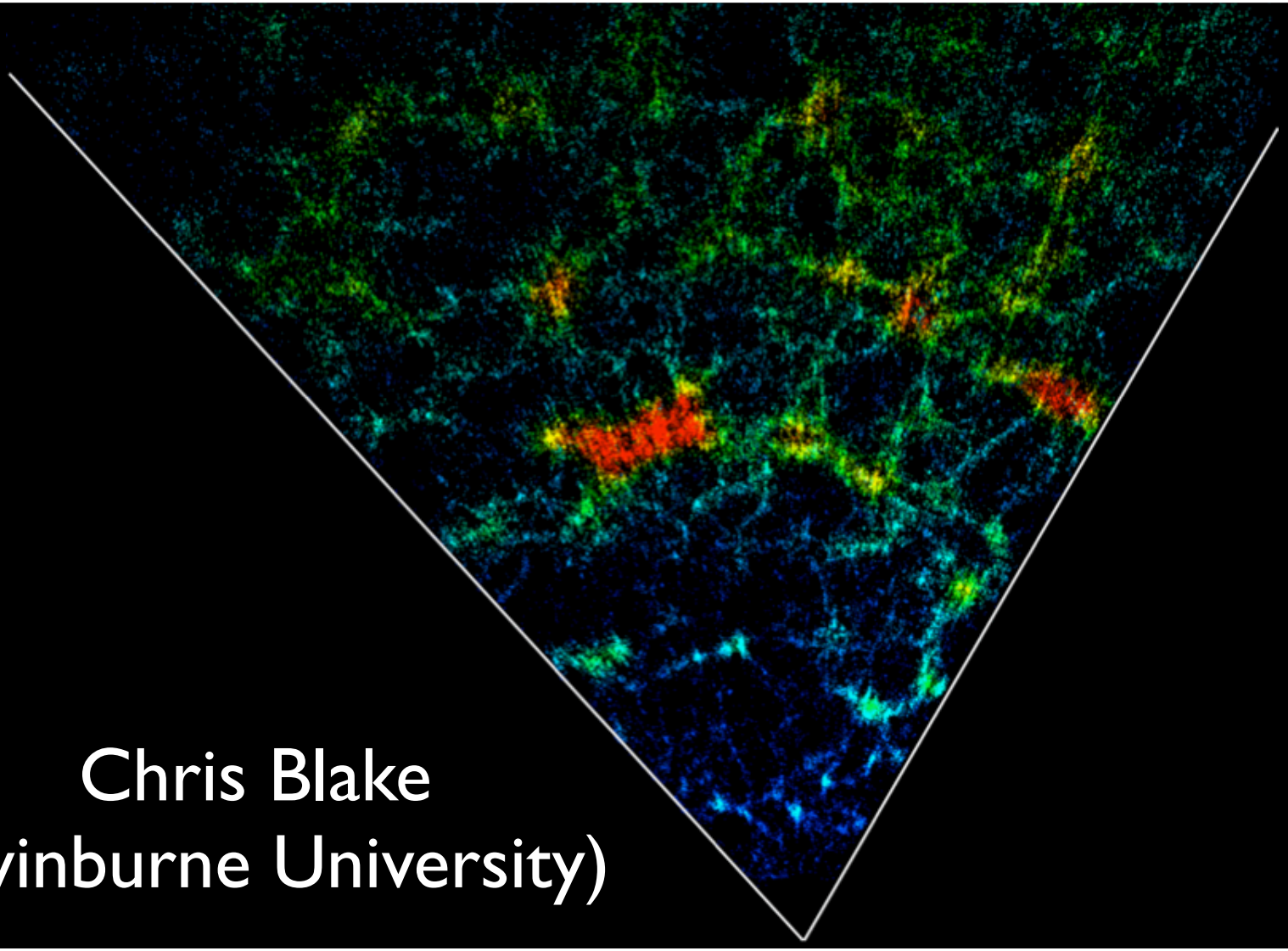
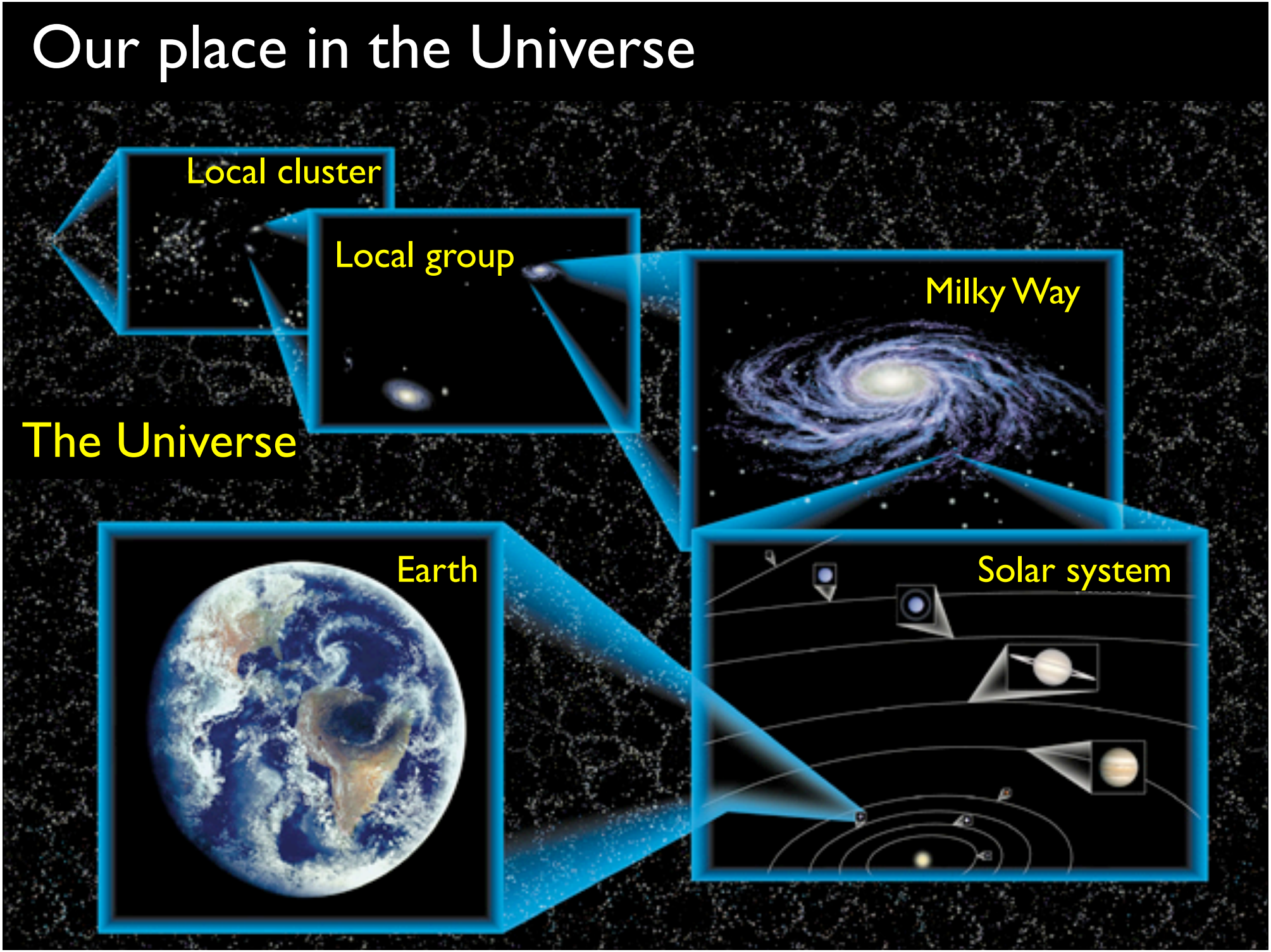
What is empty space? : the physics of dark energy

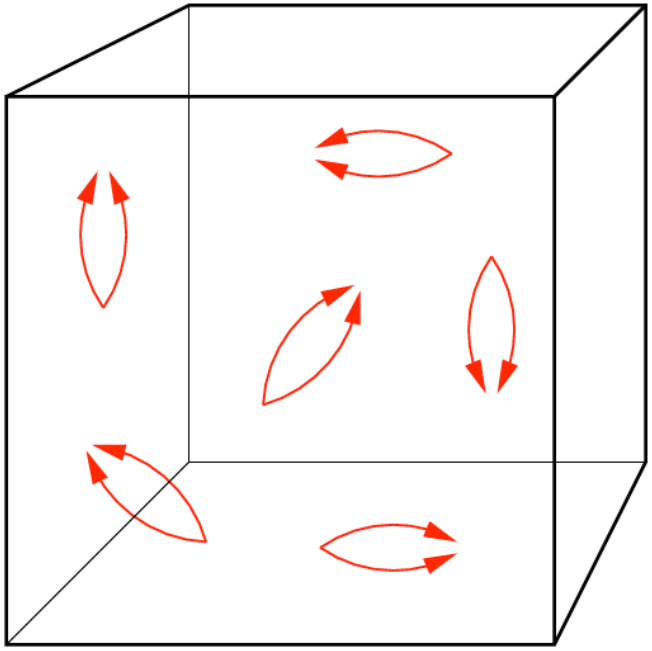


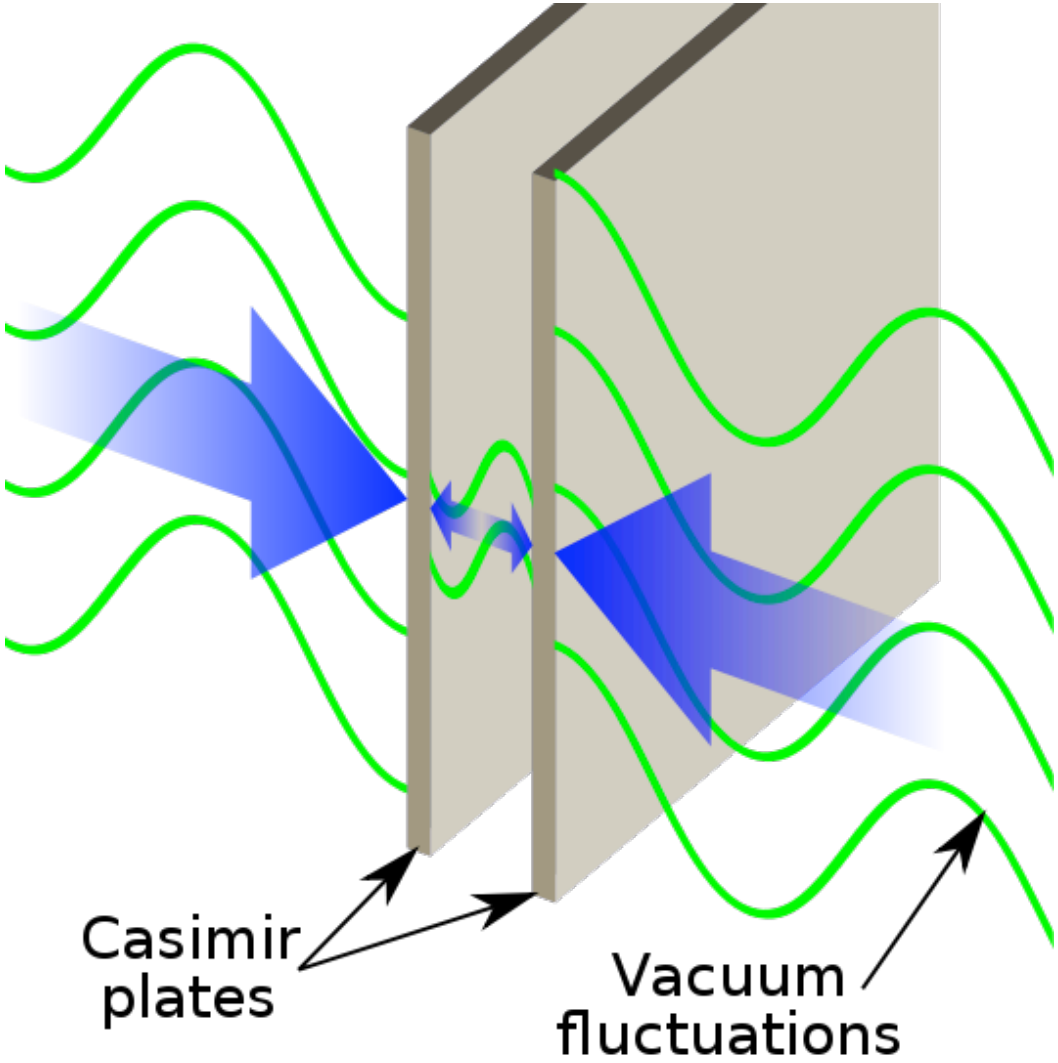
Chris Blake
(Swinburne University)

Our place in the Universe

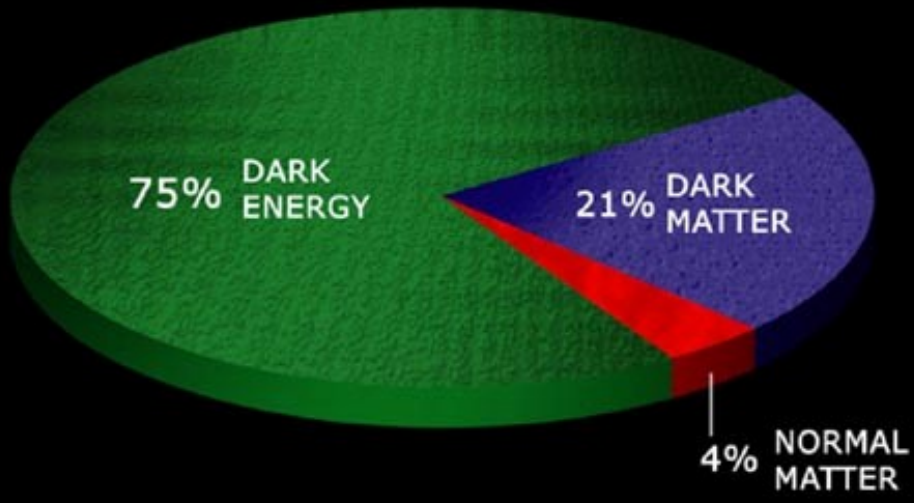


No such thing as nothing : the Casimir effect

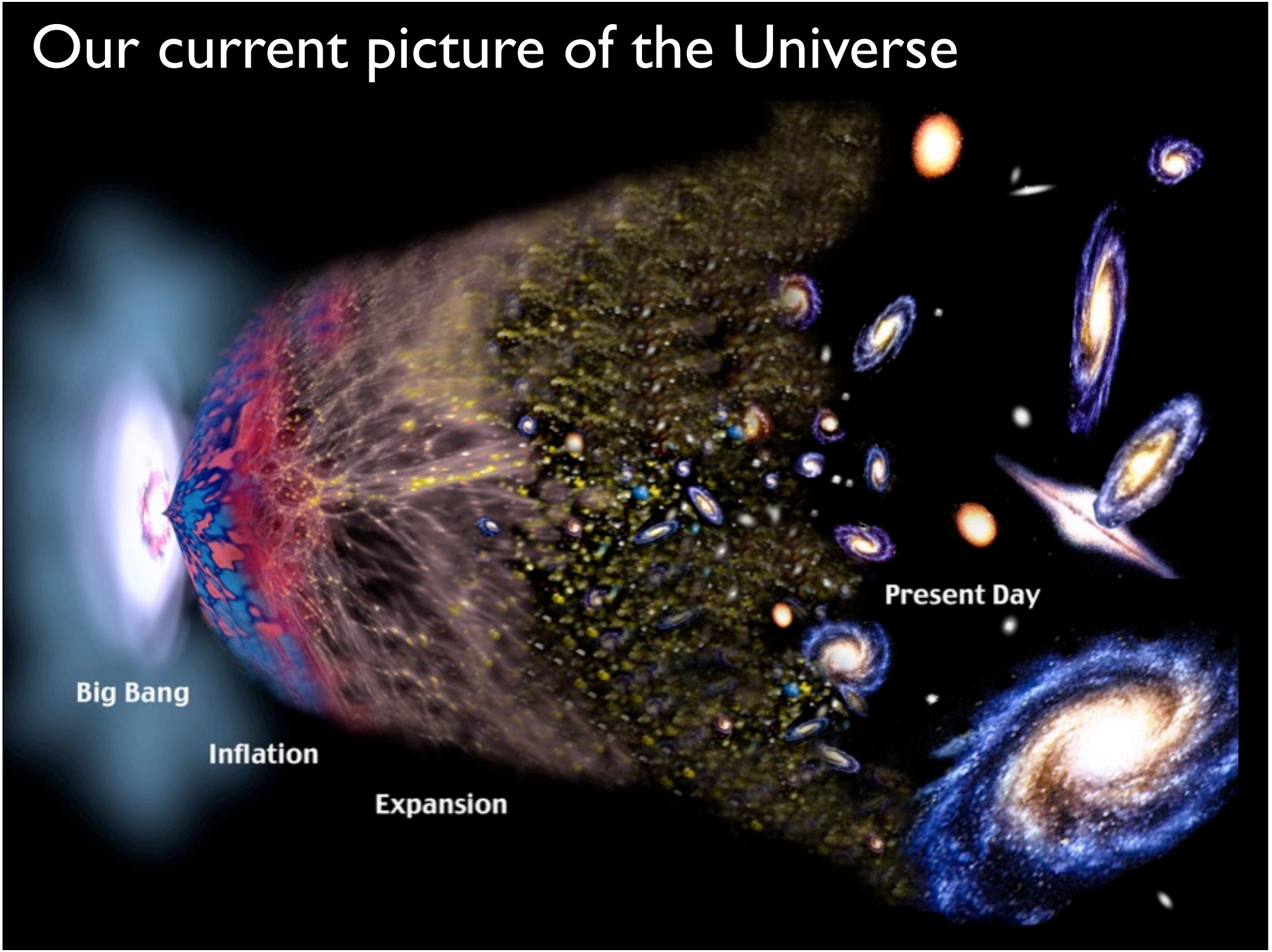




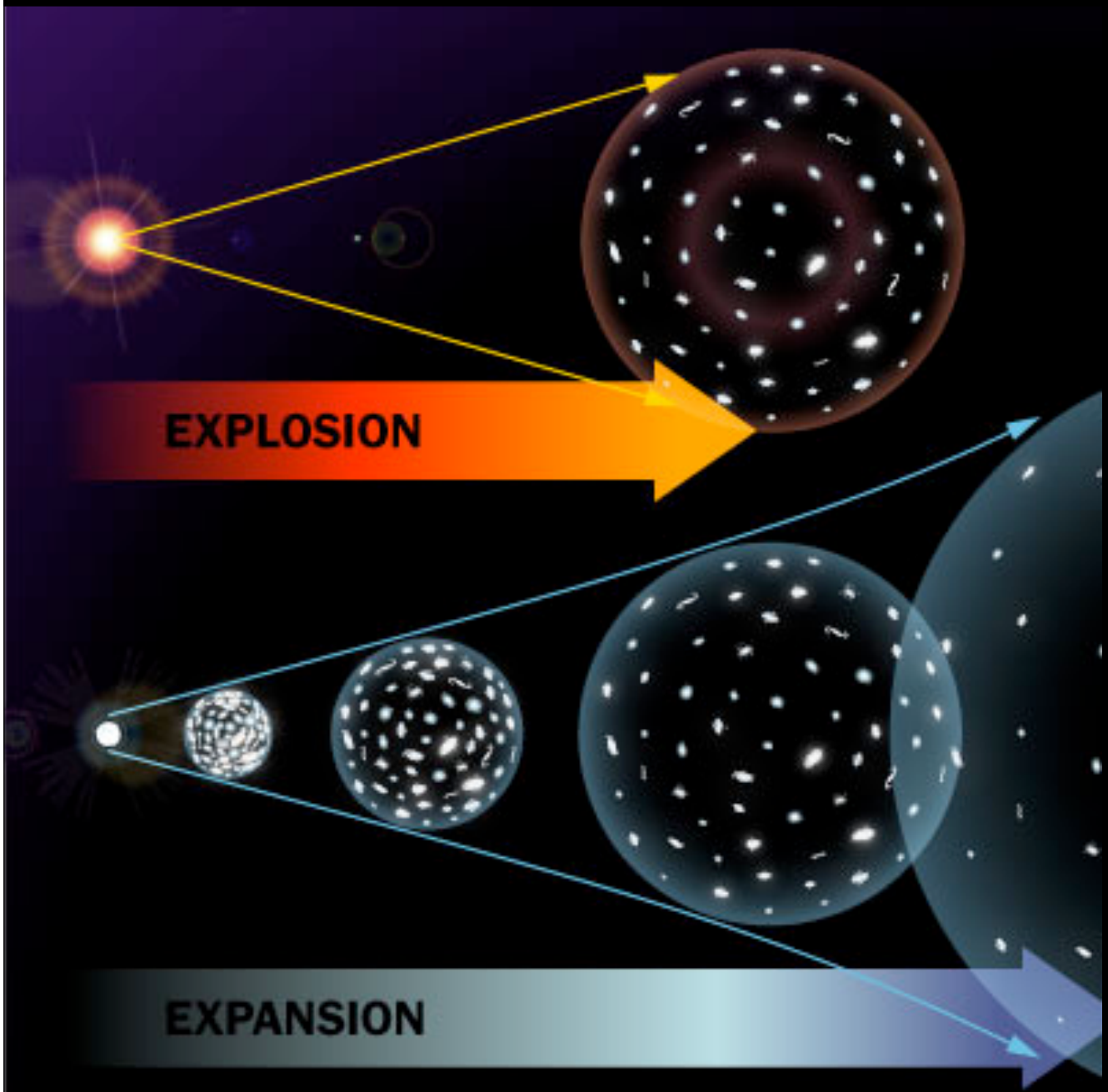
What does a cosmologist do?



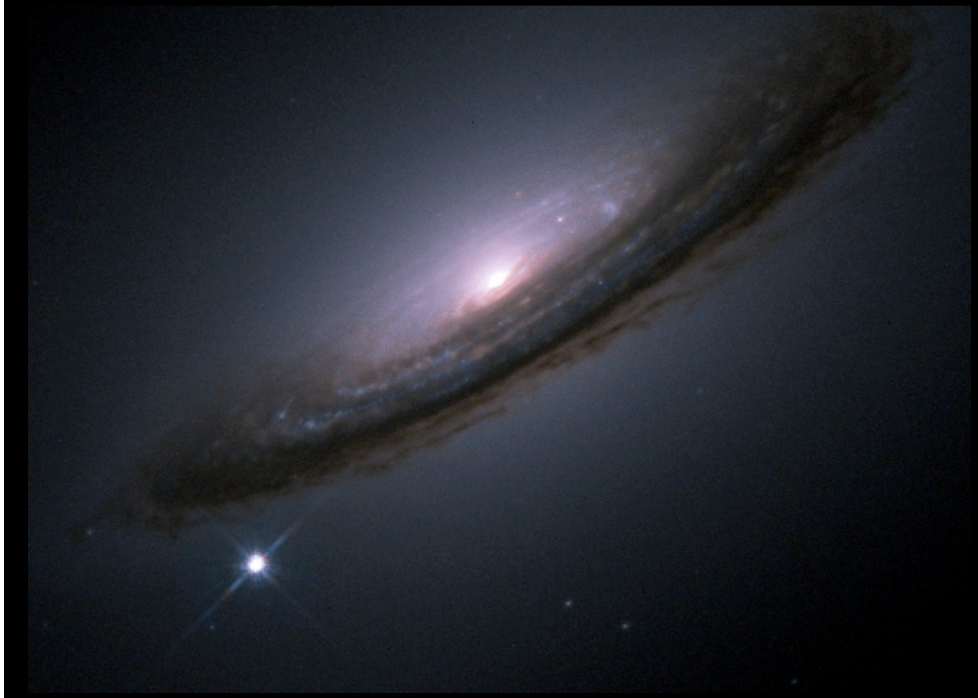
Our current picture of the Universe

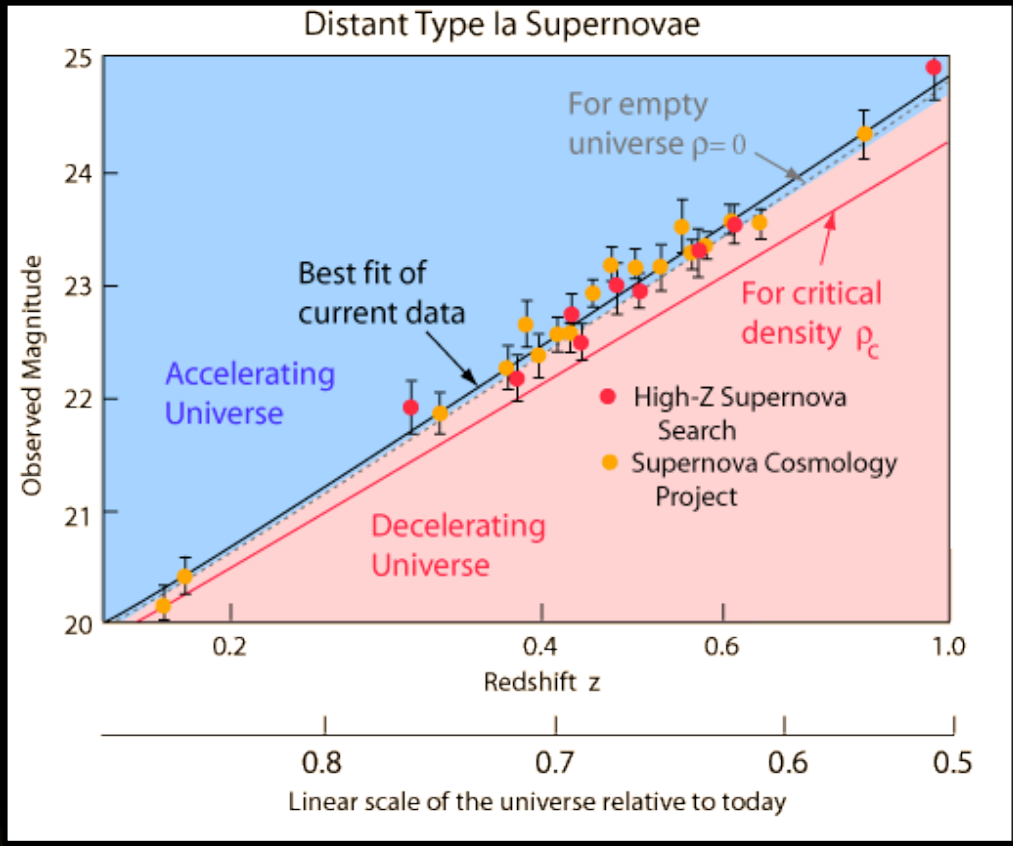


The Universe is expanding ...

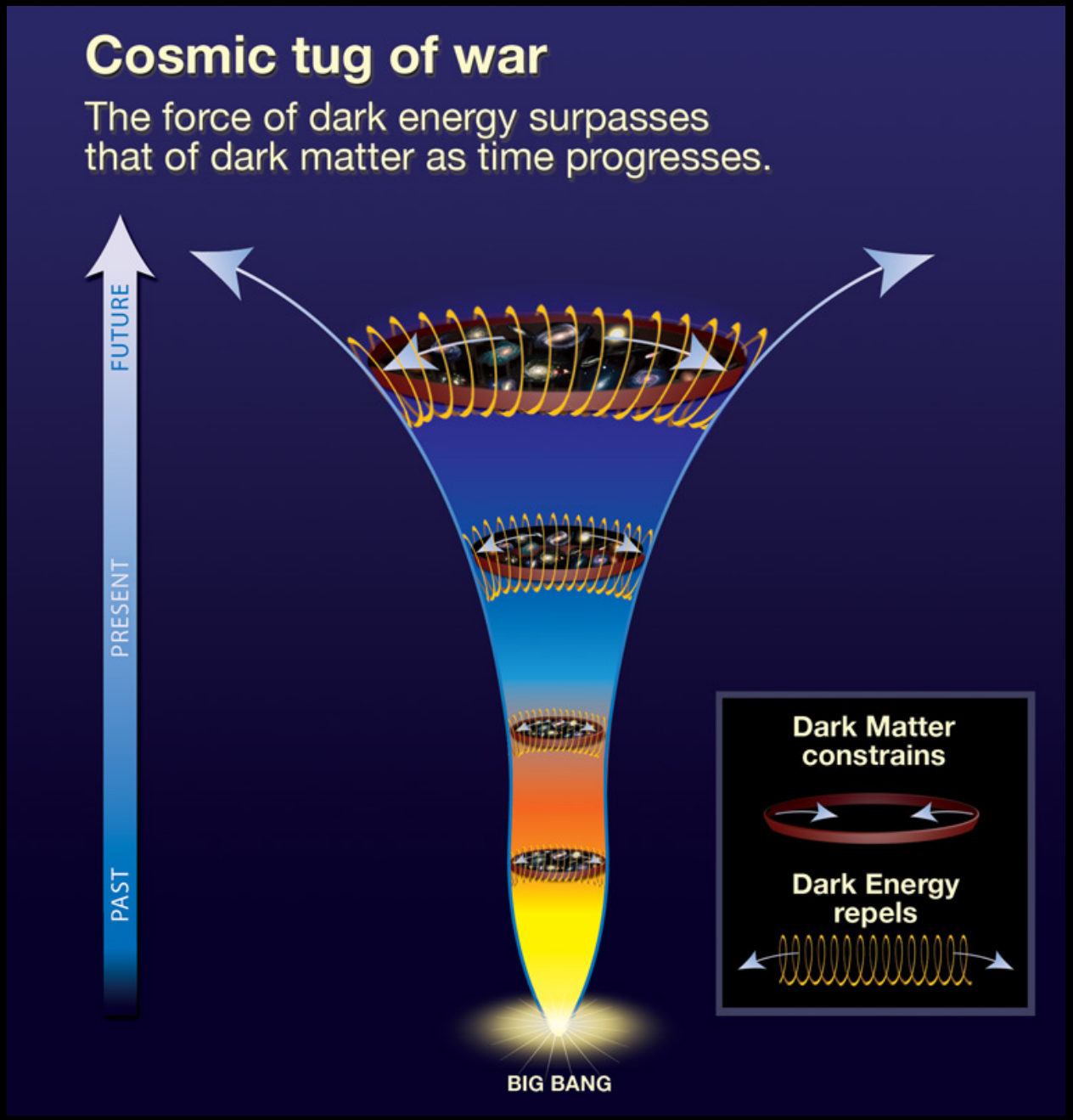


... and the expansion is speeding up ! ...

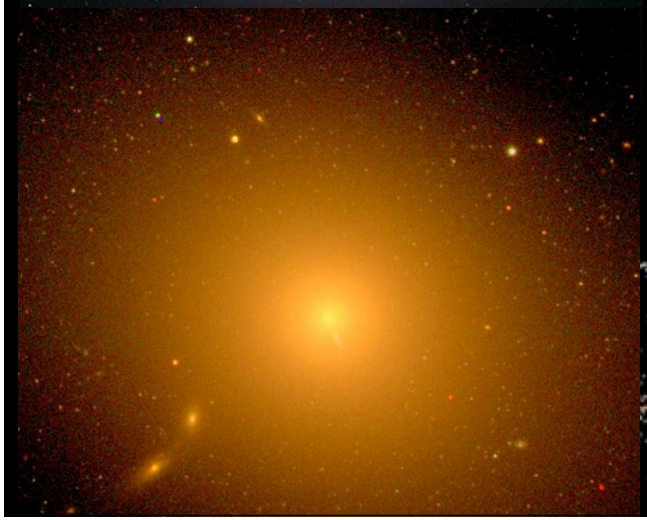


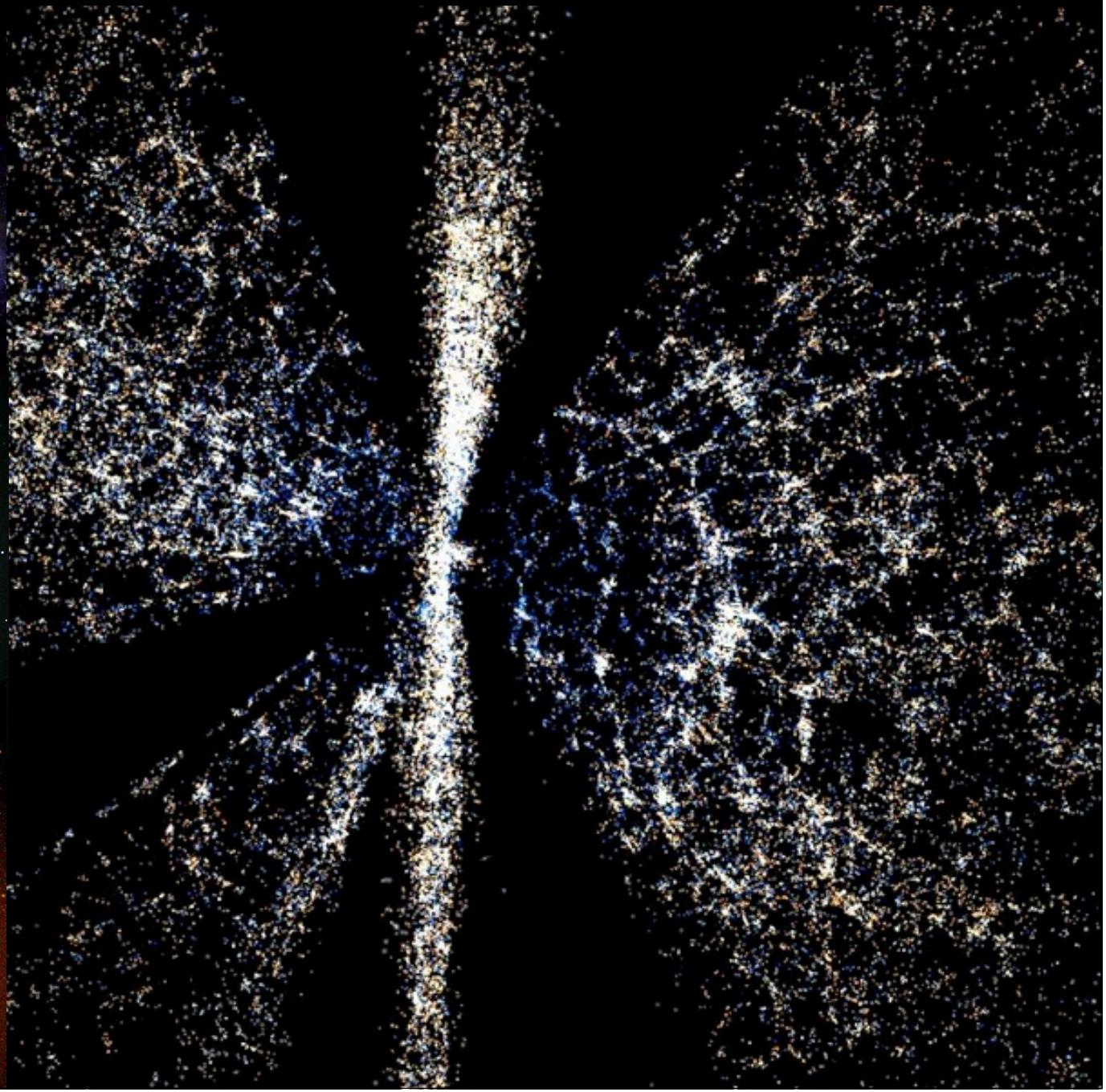


... driven by an unknown “dark energy”

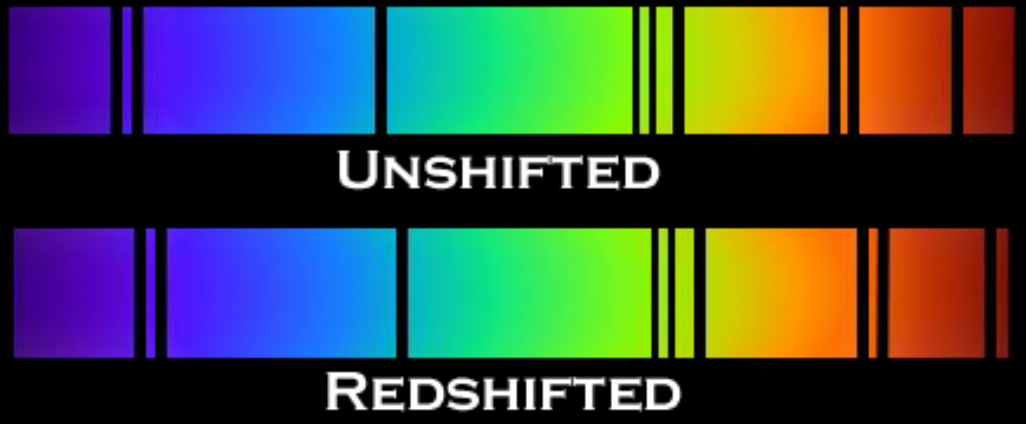


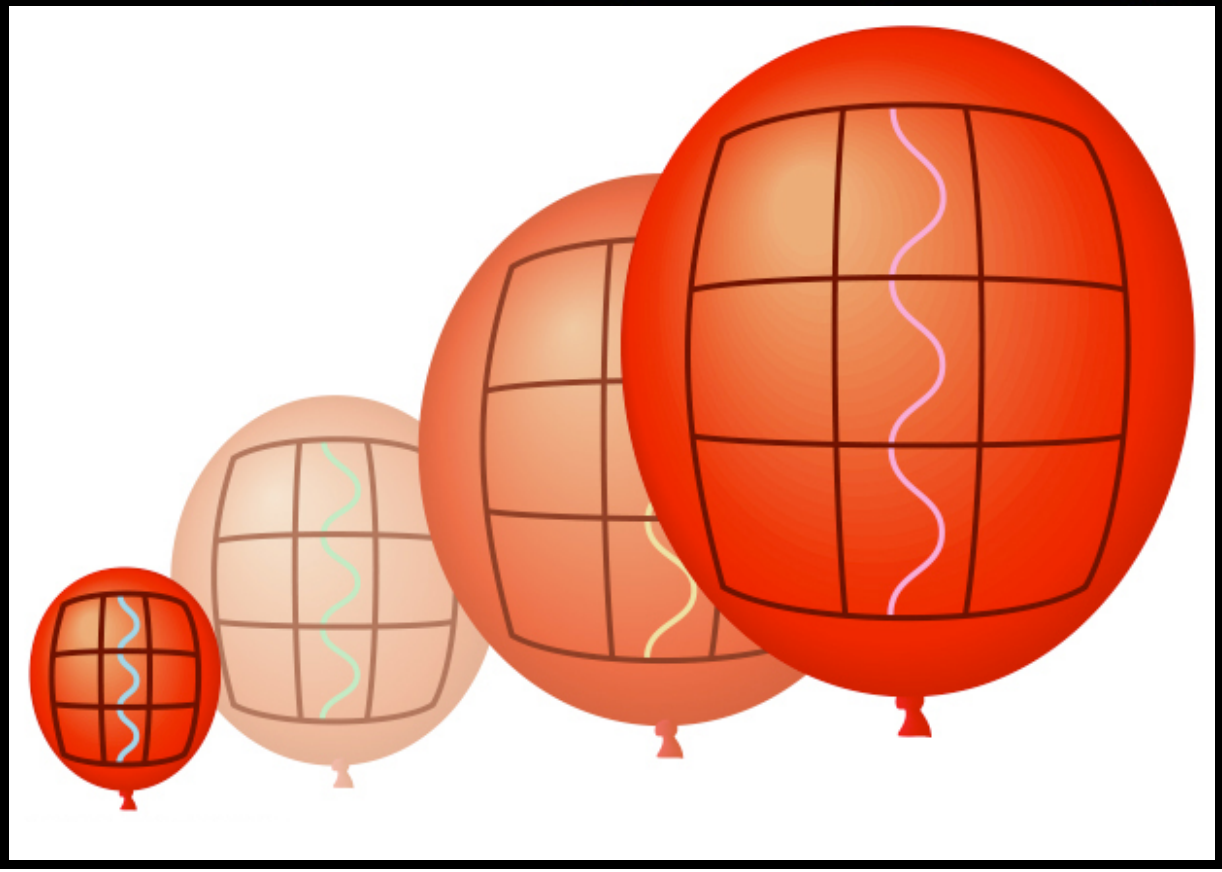
My research : galaxy maps



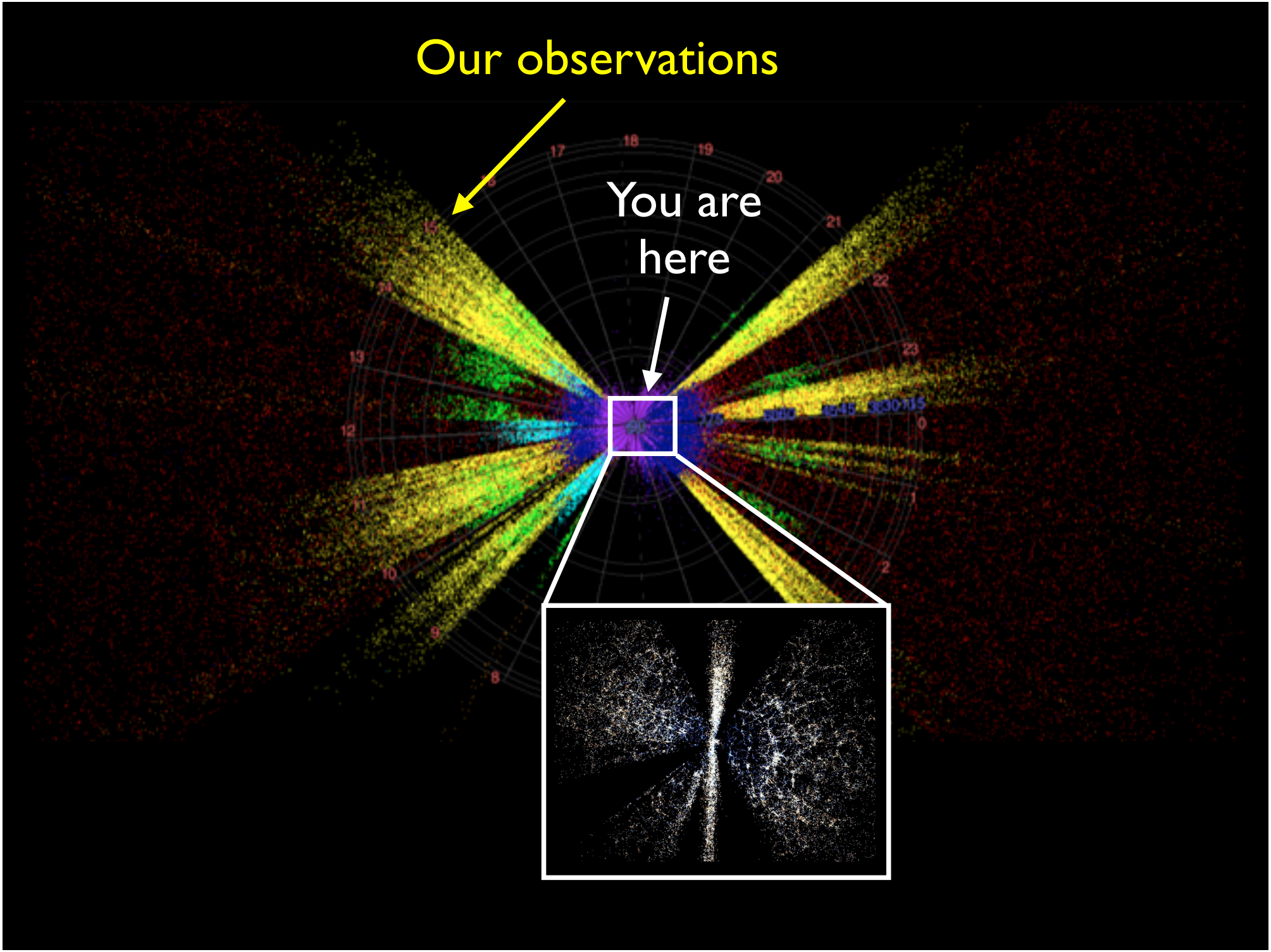


Making the map : redshift



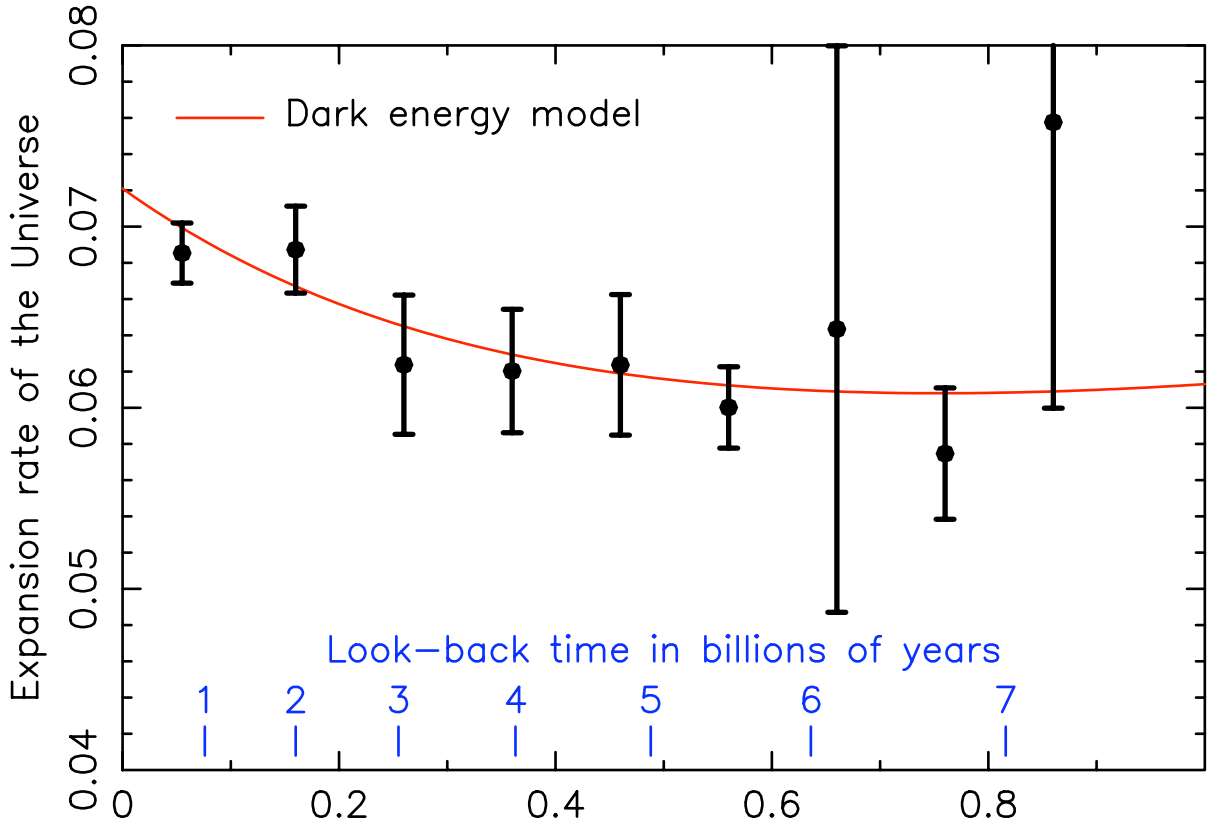


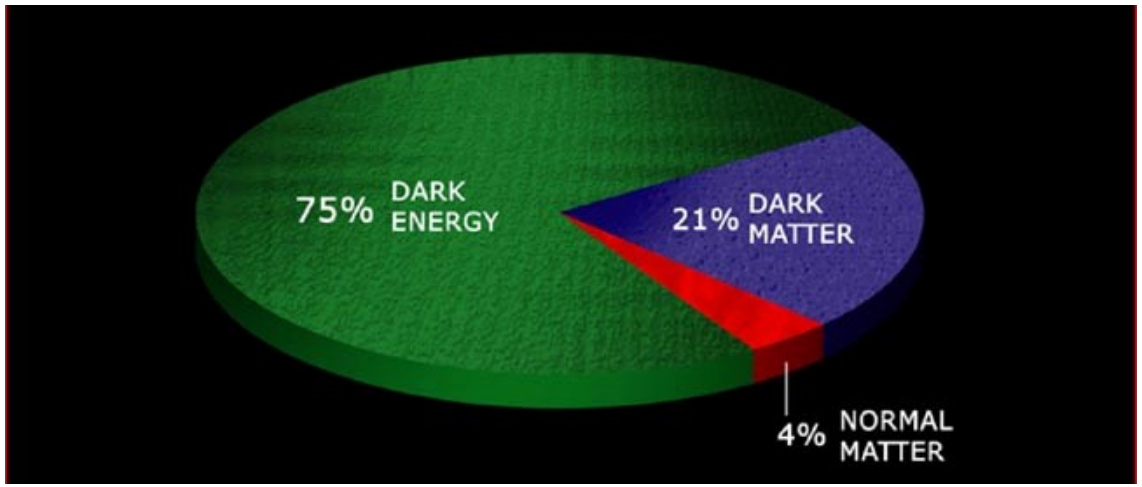
Australia is a world-leader in this science !


Our observations
You are here

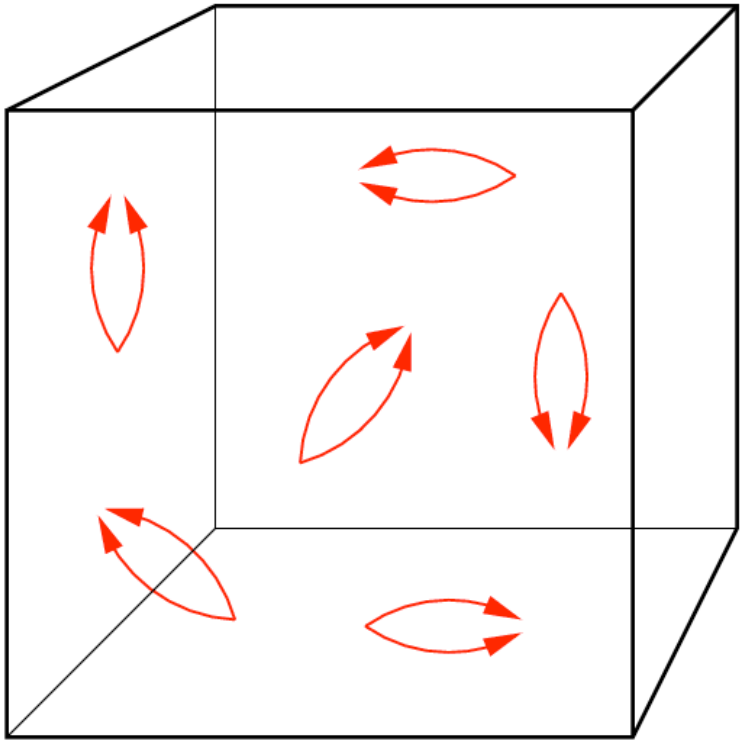
Our result : new evidence for dark energy

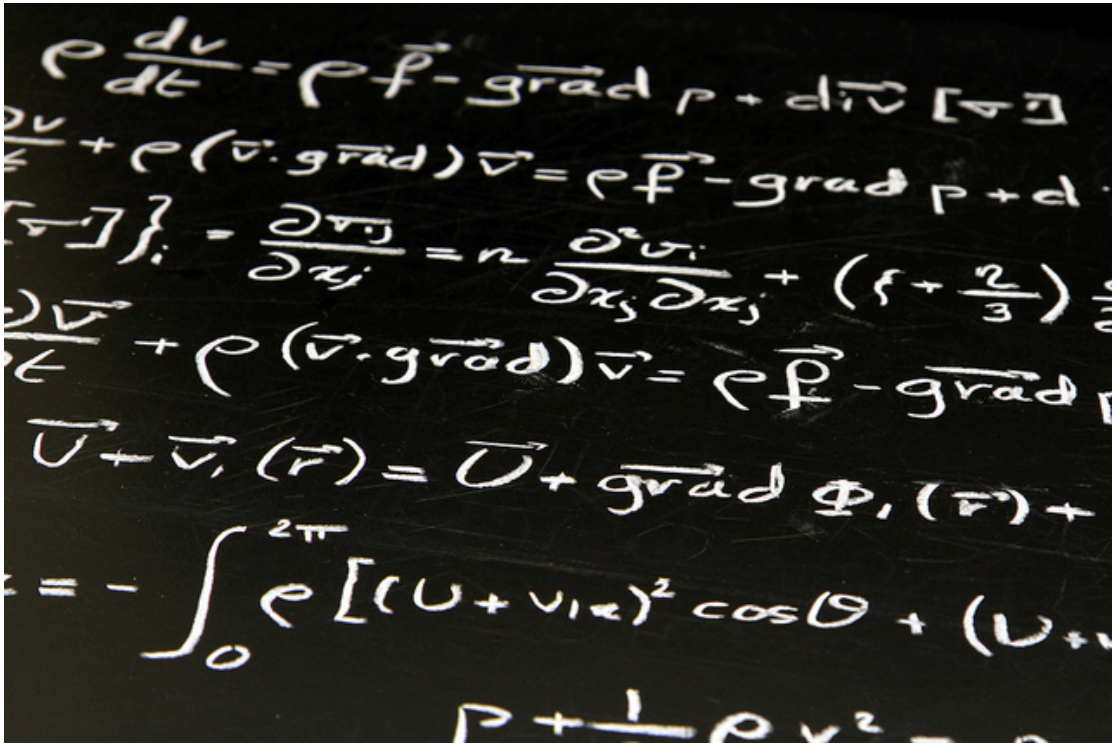
After 5 years of work ...





Is dark energy the quantum vacuum energy?



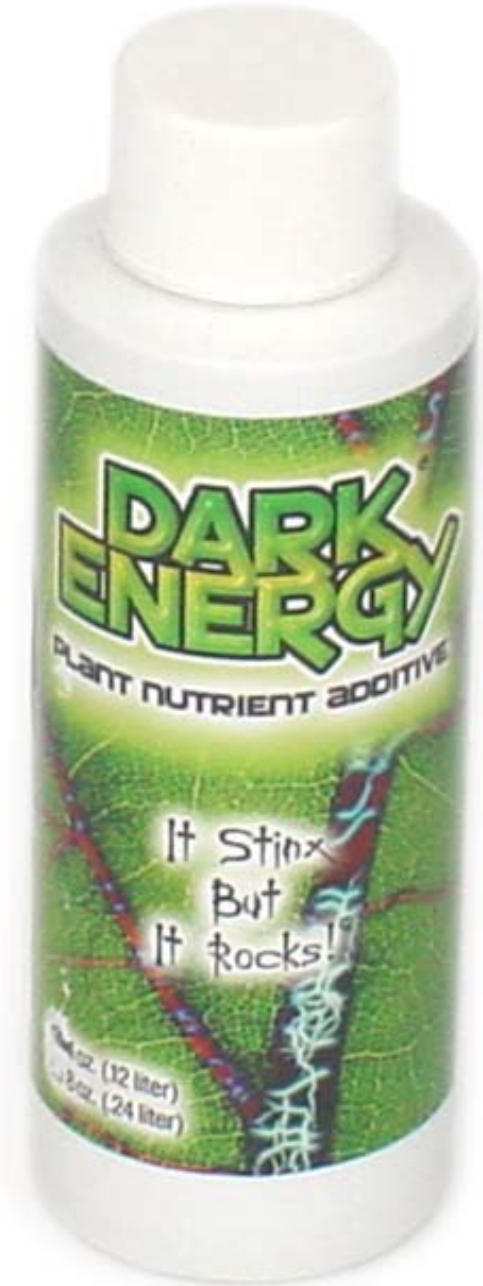


Measured dark energy density = 10^{-26} kg m^{-3}

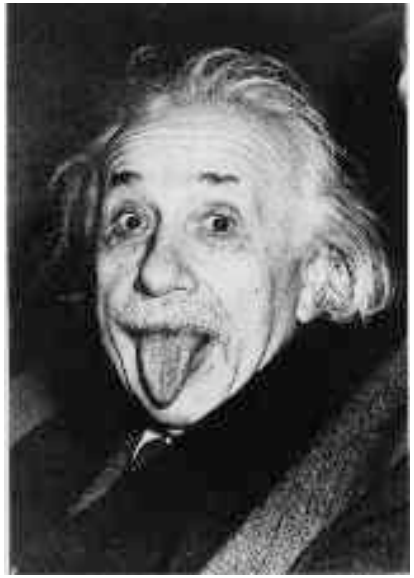
Predicted vacuum energy density = 10^{+96} kg m^{-3}

"The worst prediction in the history of physics"

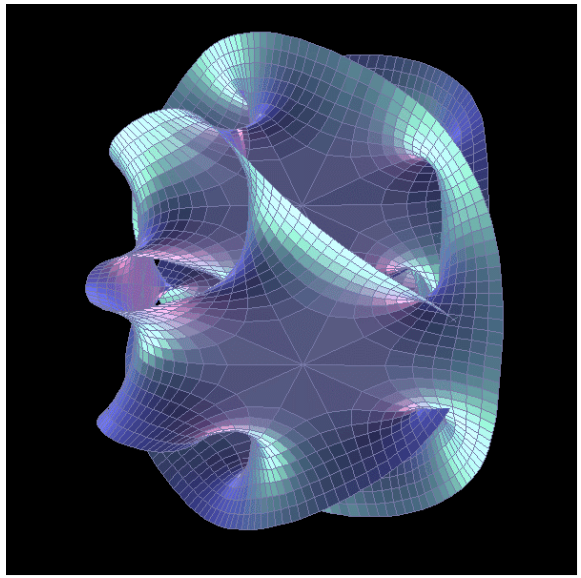
In that case , what is dark energy?



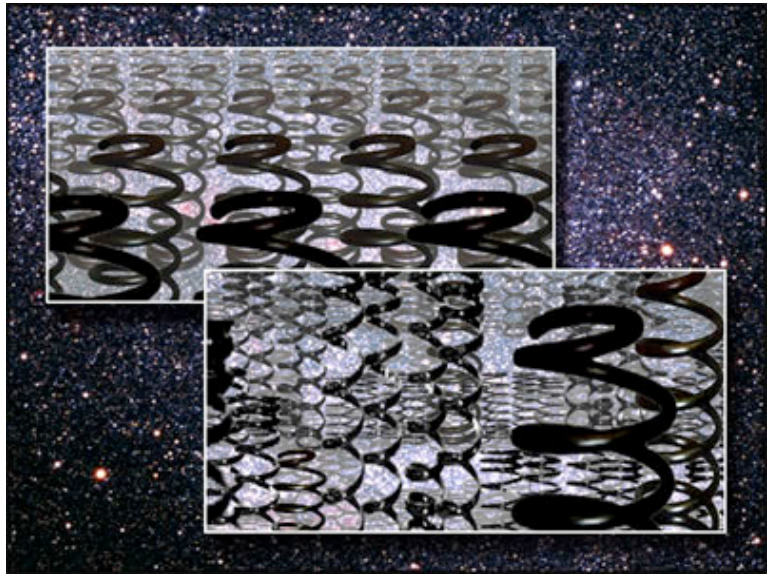
New laws of gravity?



Extra dimensions?

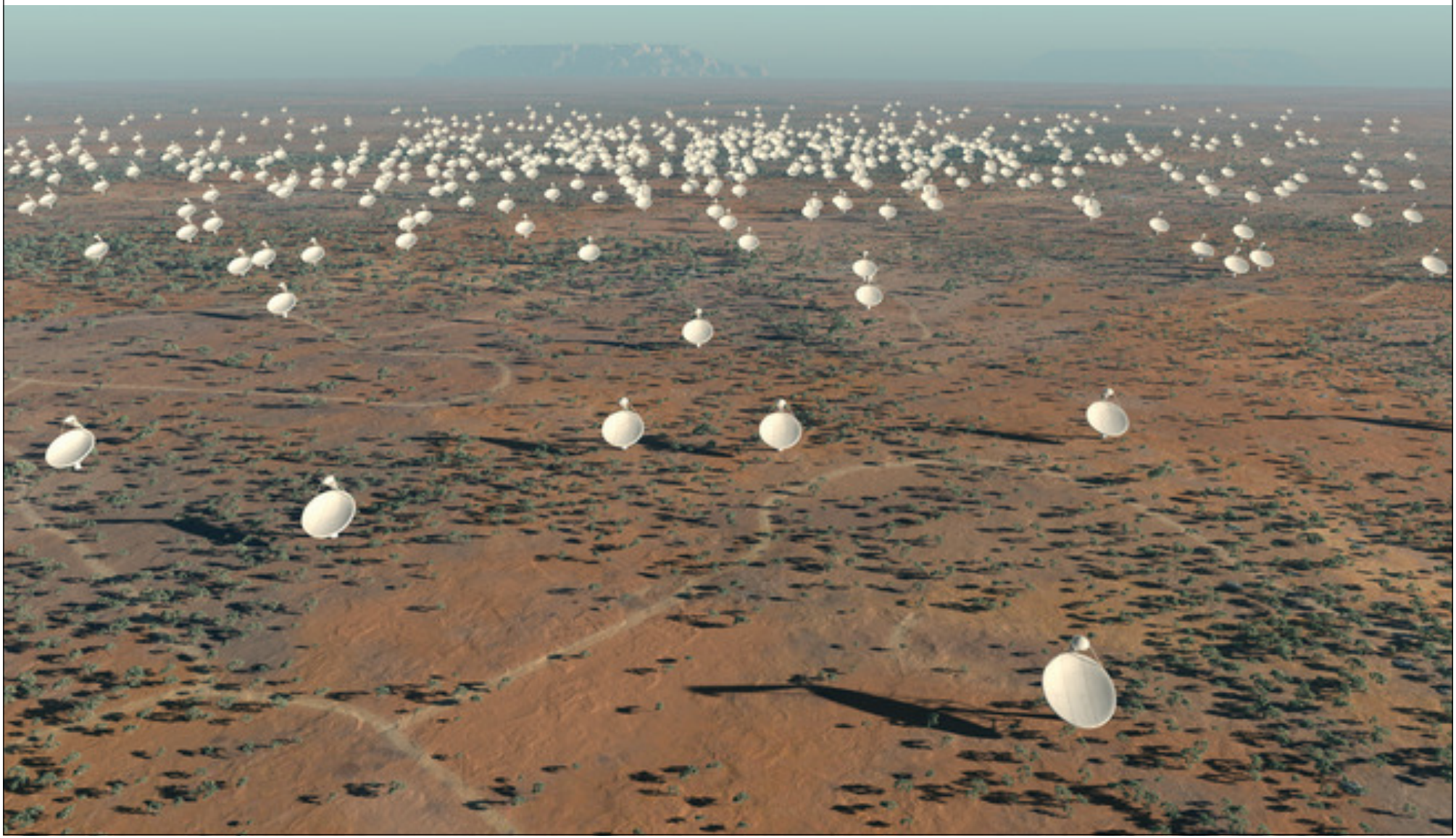


New cosmic materials?



Good prospects for the future

Square Kilometre Array radio telescope ...



Thank you ...