

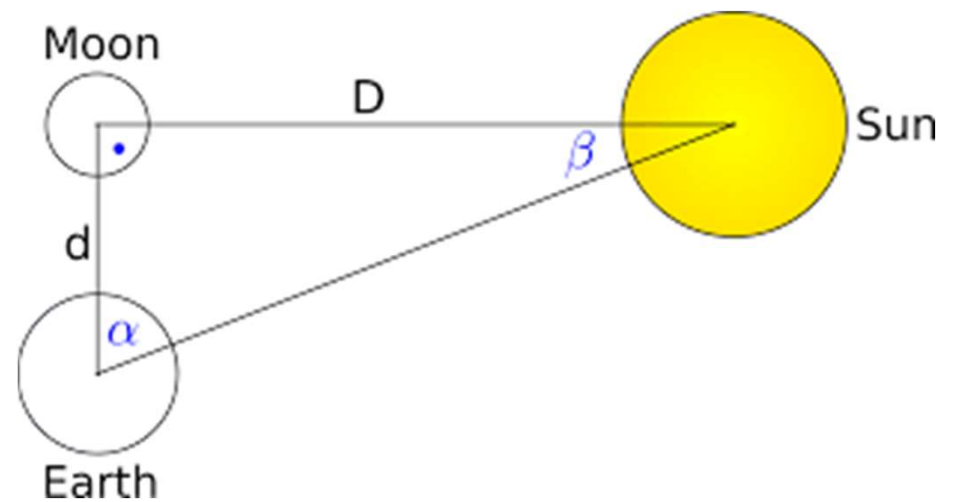
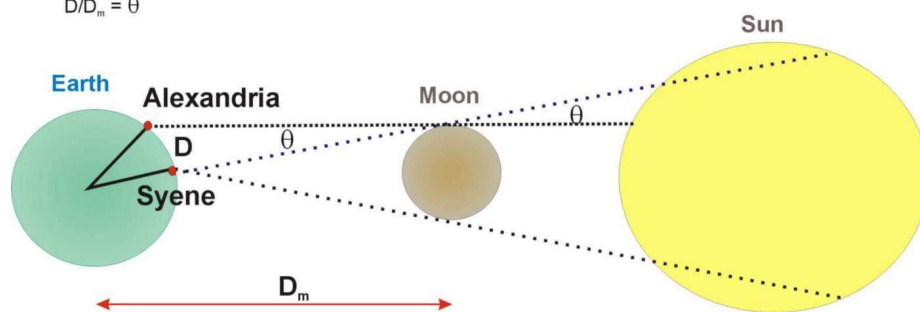


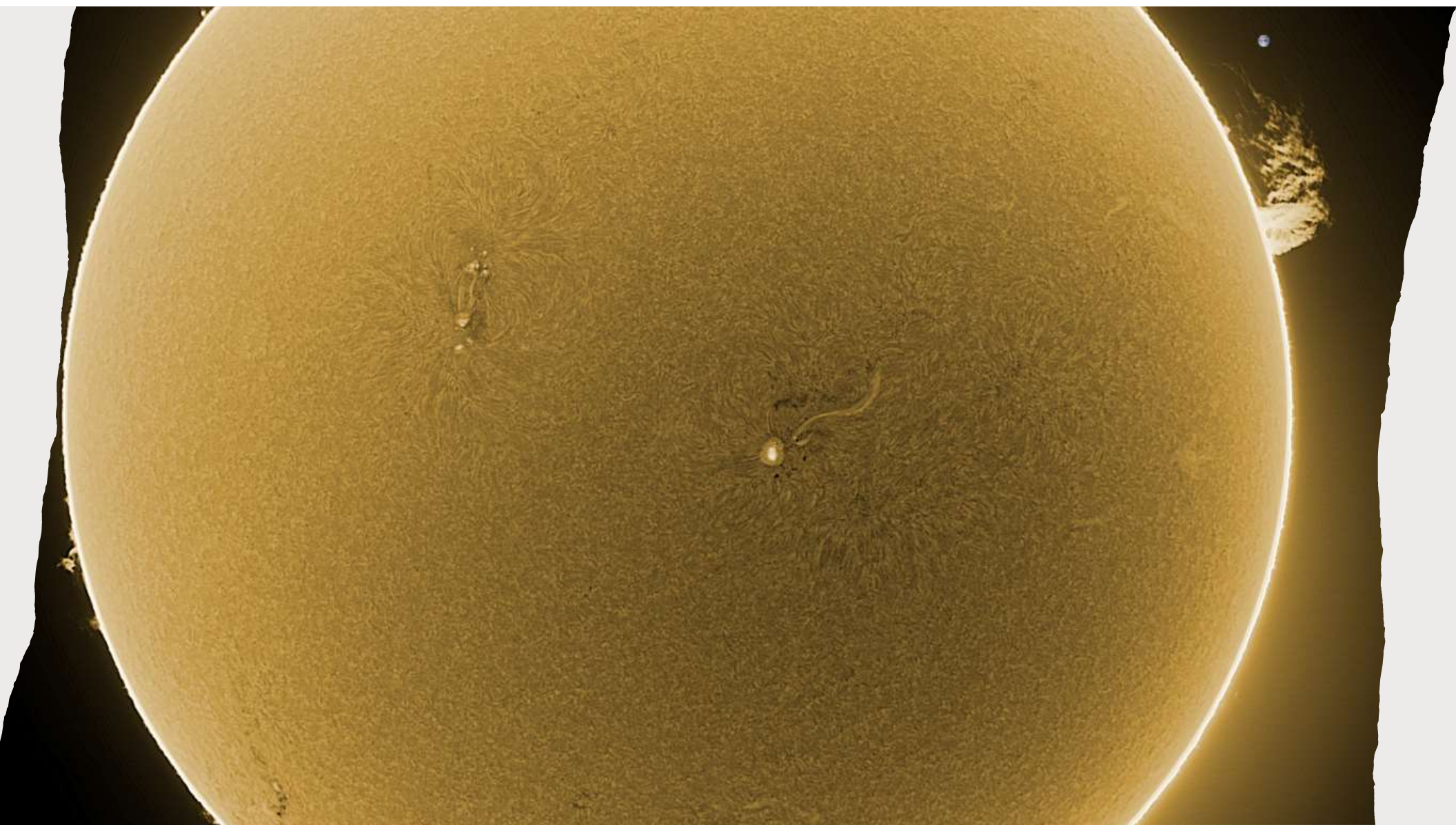
Η Θέση μας στο Σύμπαν

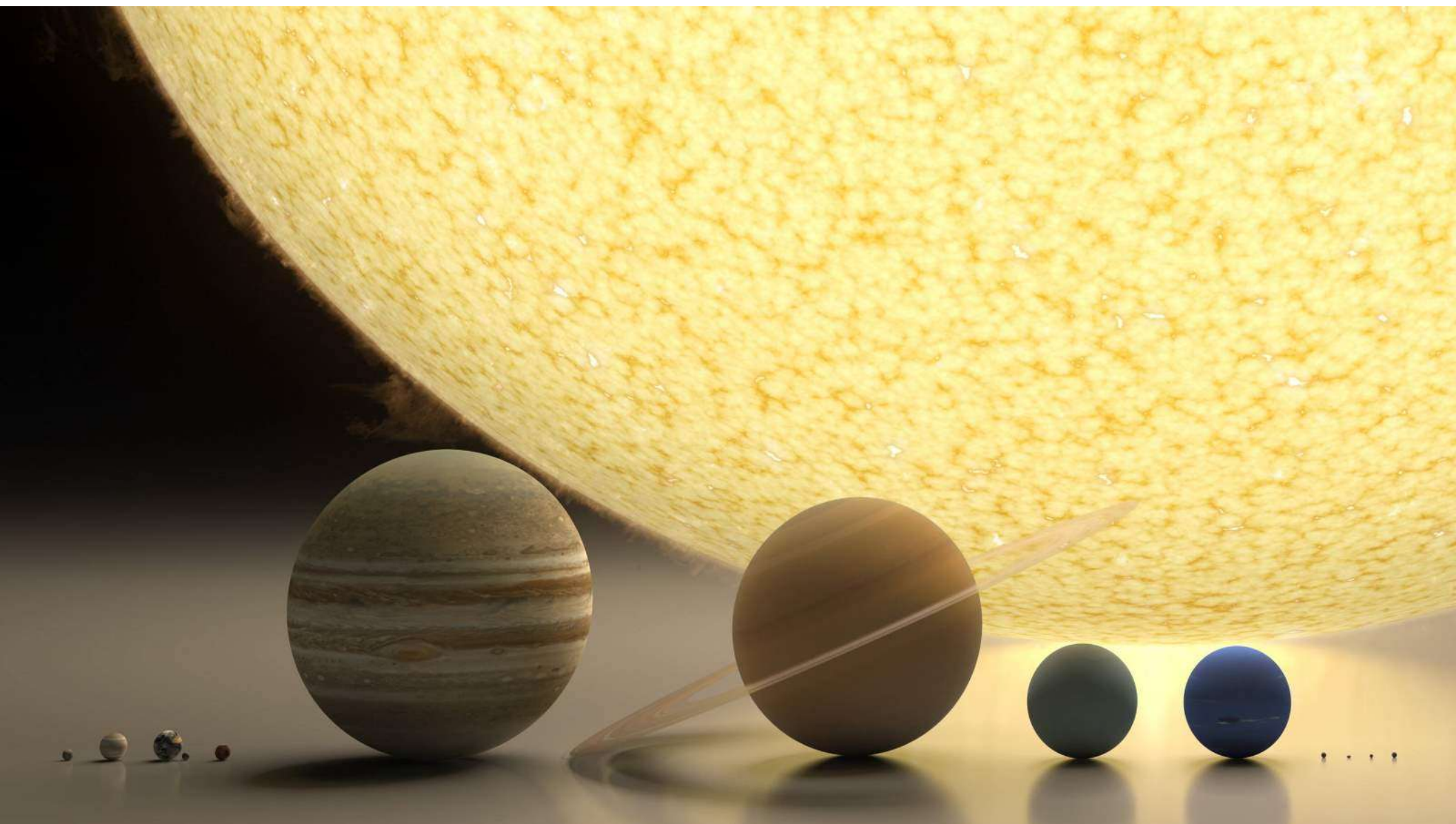
Χ. Καμπάνης

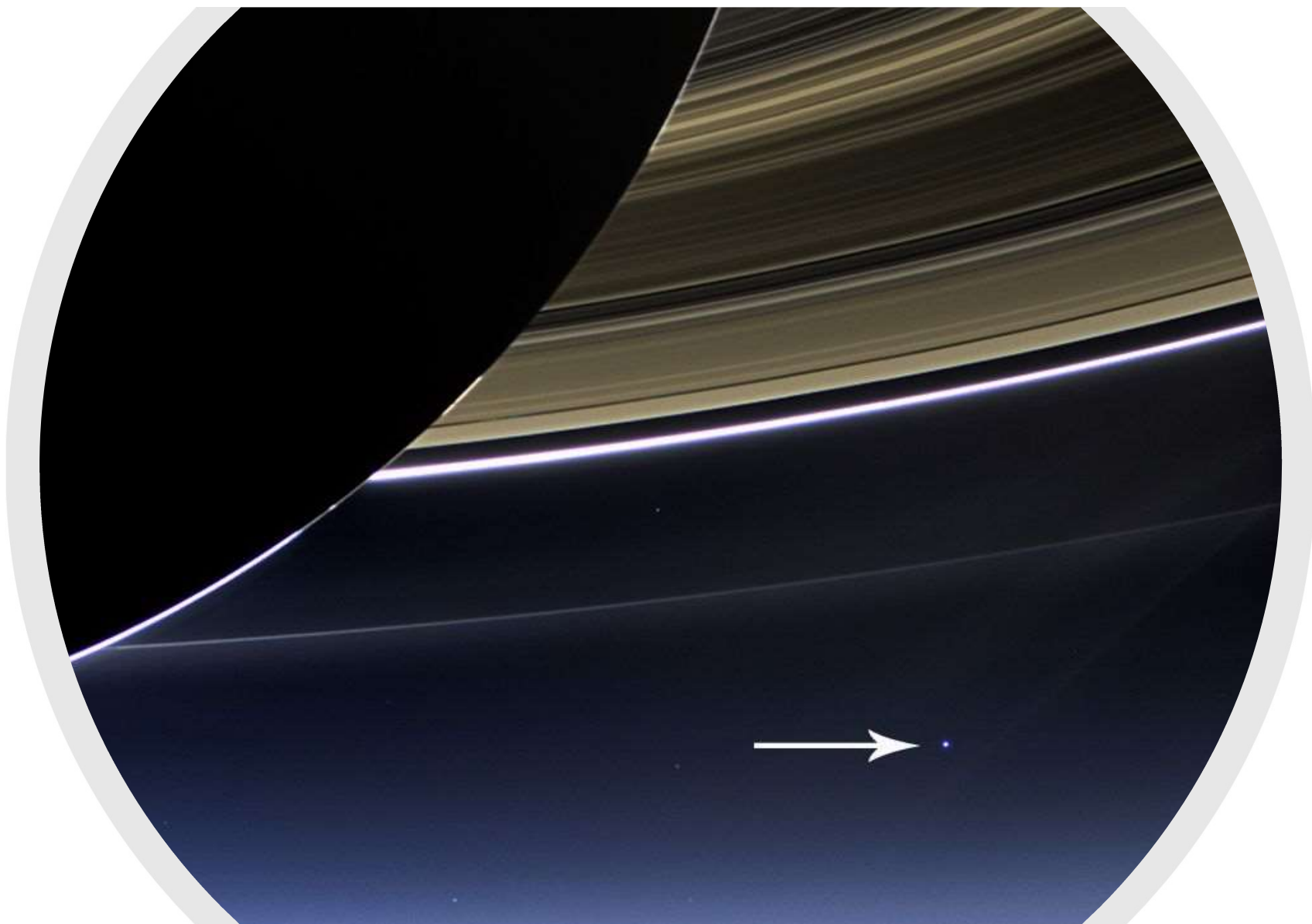
Line of sight from Alexandria
 Area of shadow produced from the moon

When a total eclipse of the sun is observed in Syene, in Alexandria an observer saw 1/5 of the sun.
 Then angular size of the moon and the sun is $1/2^\circ$, $\theta = 1/10^\circ$
 $D/D_m = \theta$

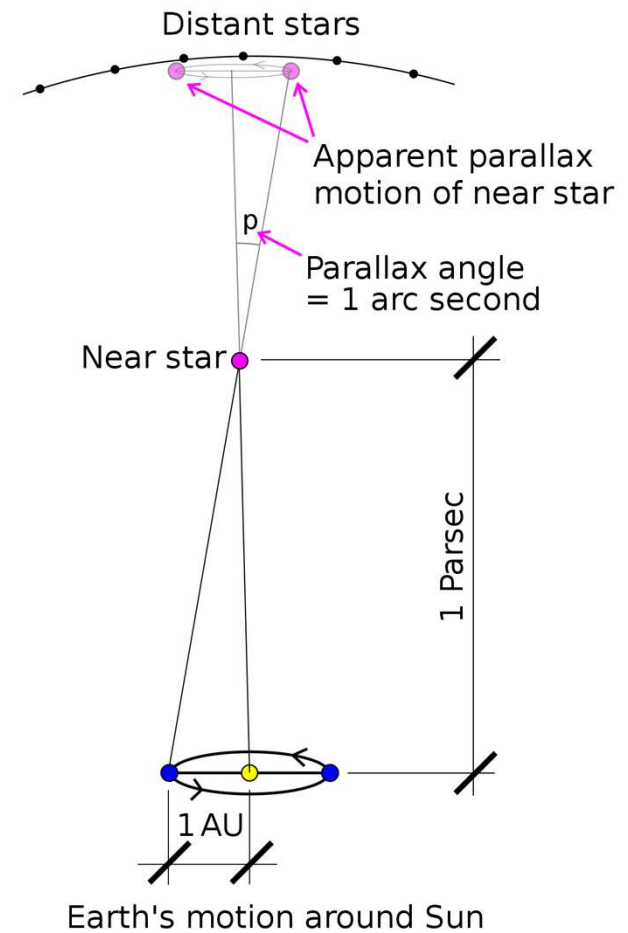




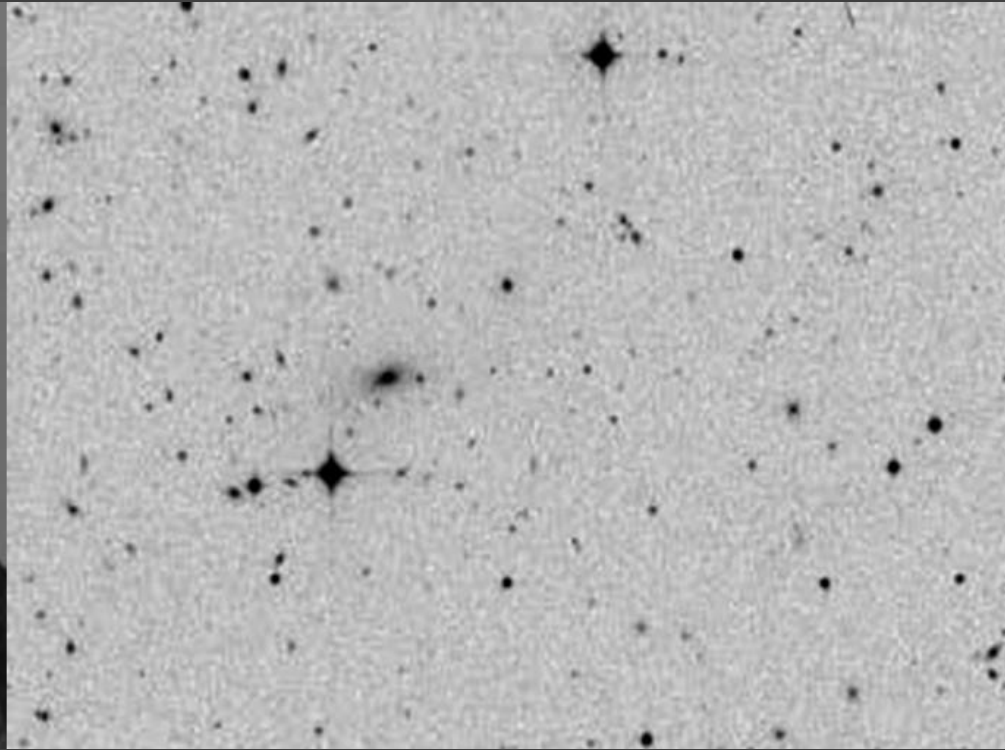




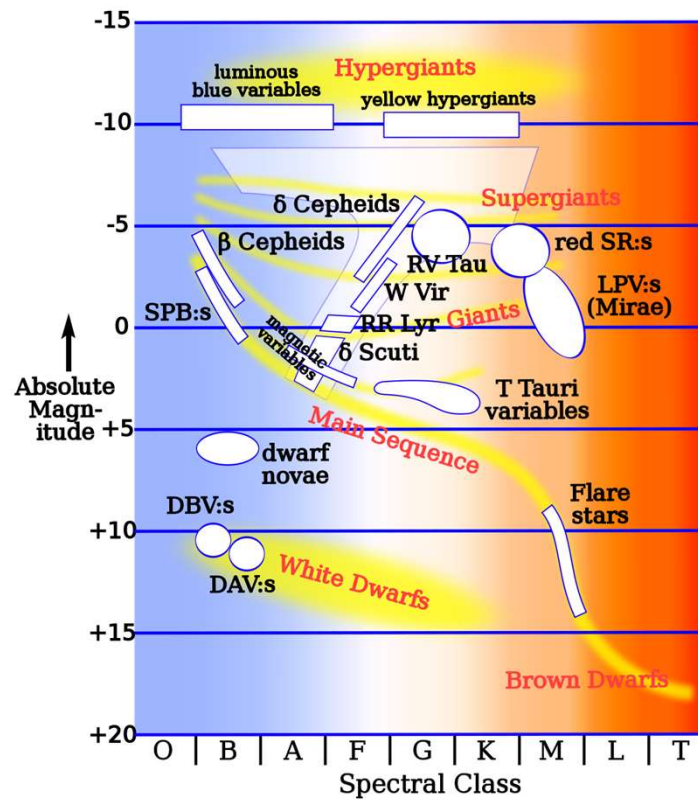
Distance to the Five Nearest Stars Using Hipparcos Data					
Star	Parallax (arc sec)	Parallax Error (arc sec)	Distance (pc)	Distance (ly) ⁺	Distance Error
* Proxima Centauri	0.77233	0.00242	1.2948	4.2231	0.31%
* Alpha-Centauri A	0.74212	0.00140	1.3475	4.3950	0.19%
* Alpha-Centauri B	0.74212	0.00140	1.3475	4.3950	0.19%
Barnard's Star	0.54901	0.00158	1.8215	5.9409	0.29%
Lalande 21185	0.39240	0.00091	2.5484	8.3120	0.23%

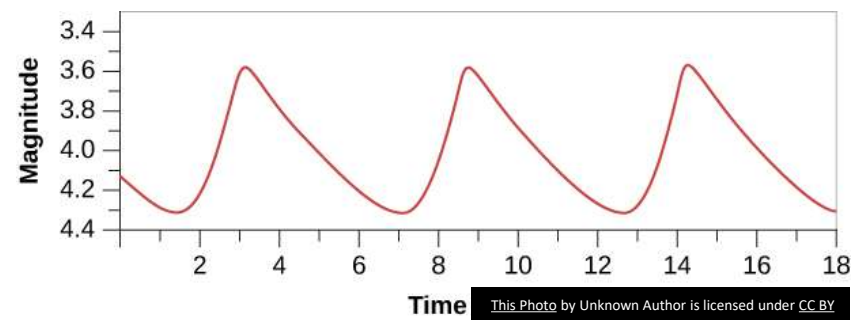
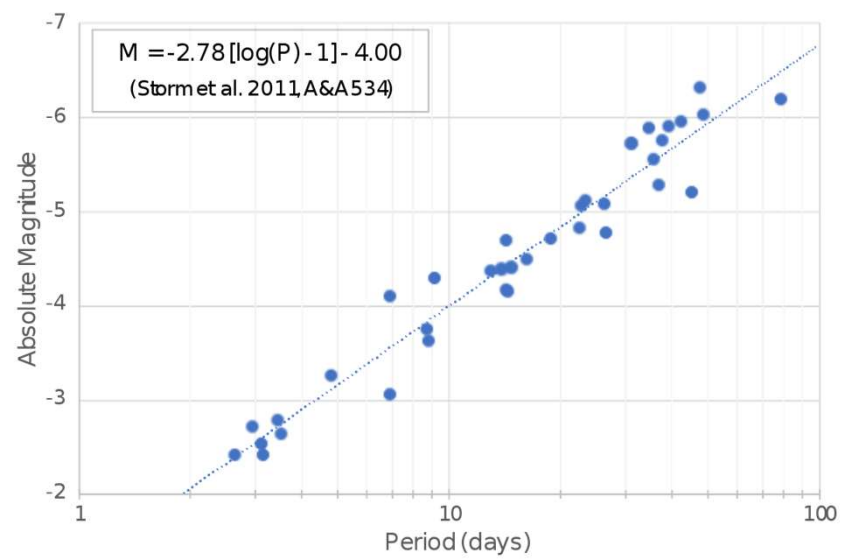






- The Great Debate 1920





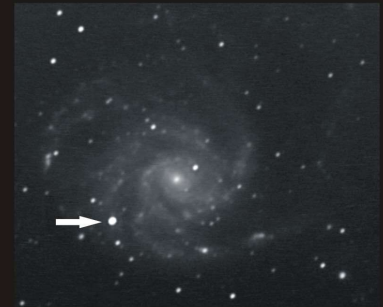
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Supernova in M101
Left Photo 11/3/2011

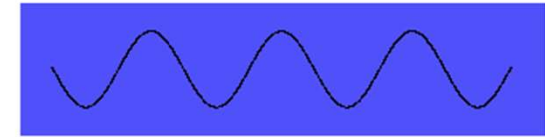


Right Photo 10/9/2011





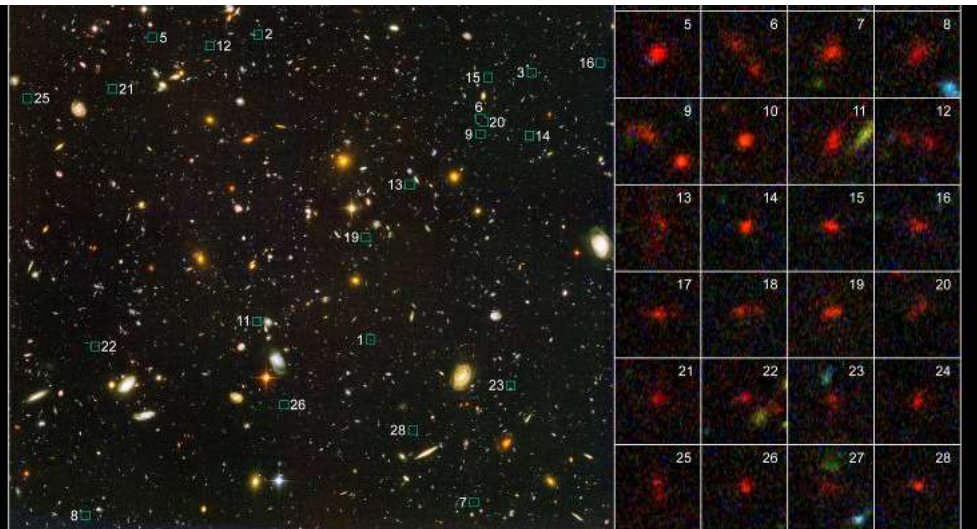
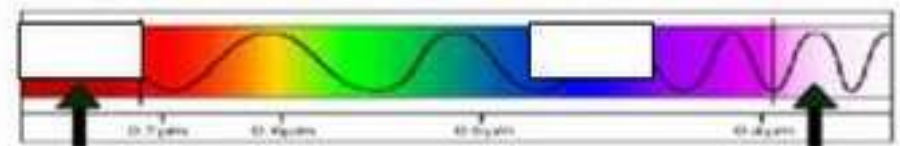
Redshift



← Universe expands with time →

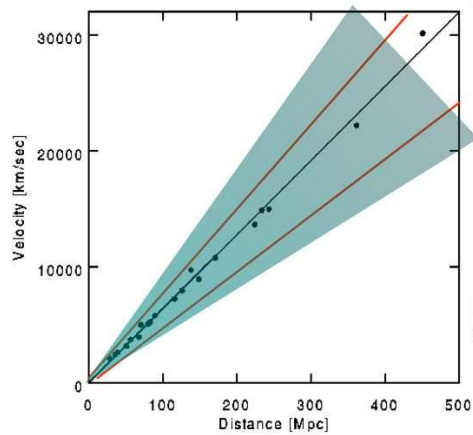


Red Shift - Blue Shift



Distant Galaxies in the Hubble Ultra Deep Field
Hubble Space Telescope • Advanced Camera for Surveys

The Hubble constant



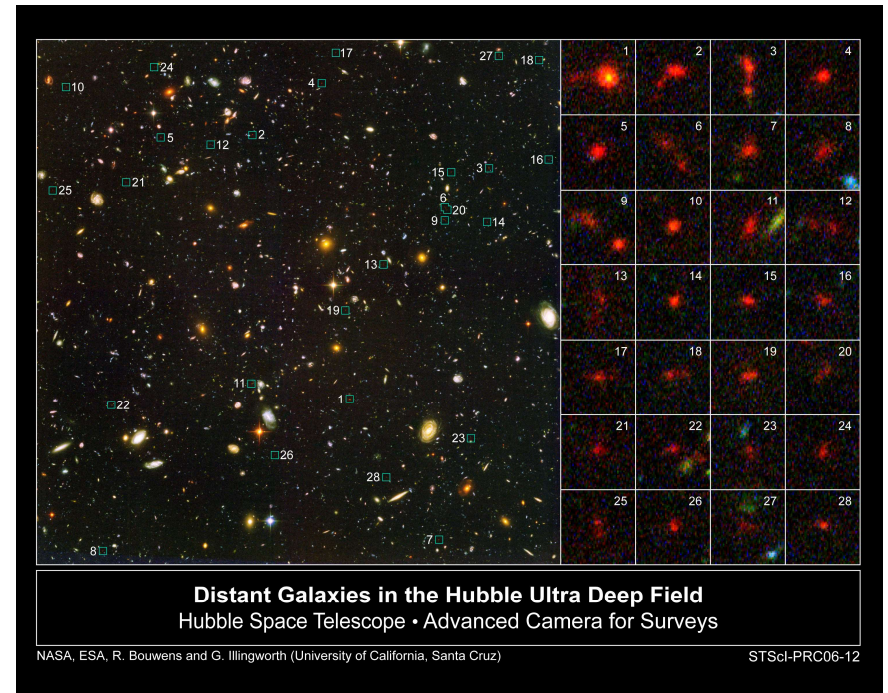
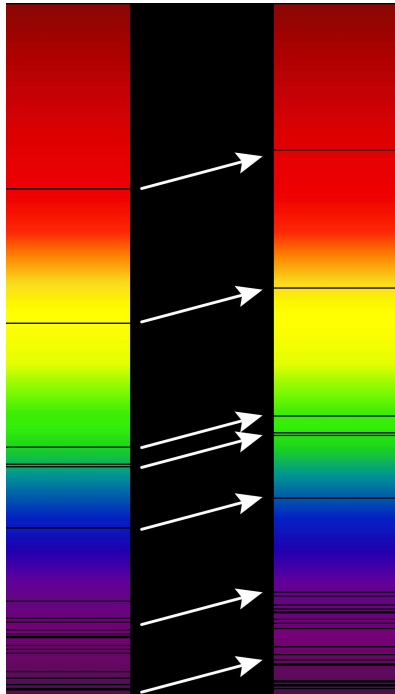
The most recent observational determination of the Hubble constant obtained in 2009 by using the HST is $H = 74.2 \pm 3.6$ (km/s)/Mpc.

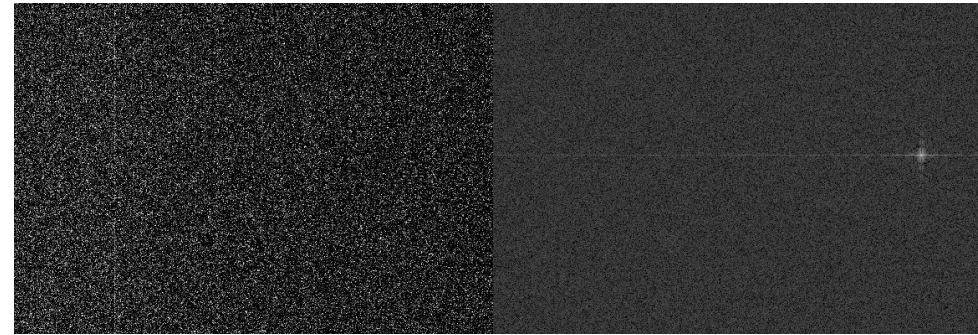
The SI unit for the Hubble constant is s^{-1} . And in this unit H is about about $2.5 \times 10^{-18} \text{ s}^{-1}$.

For the first time the rate of expansion of the universe is pretty much fixed



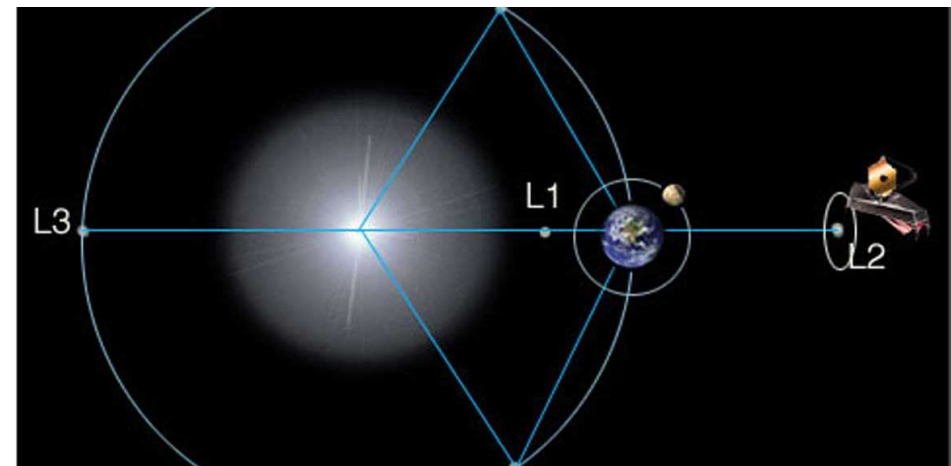
Redshift Hubble constant of 69.8 km/s/Mpc

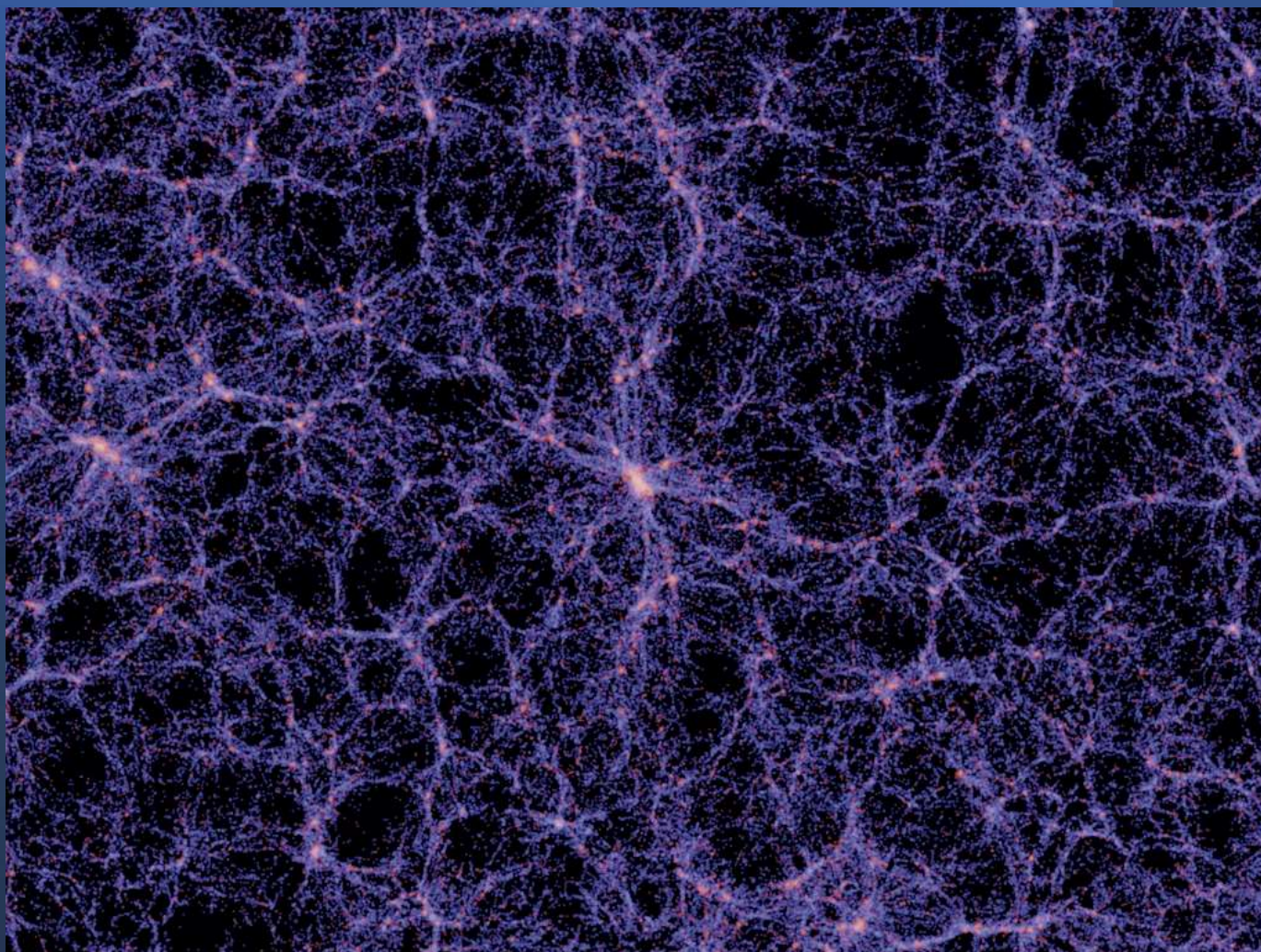




Επίστρωση Χρυσού = Αντανάκλαση στο Υπέρυθρο

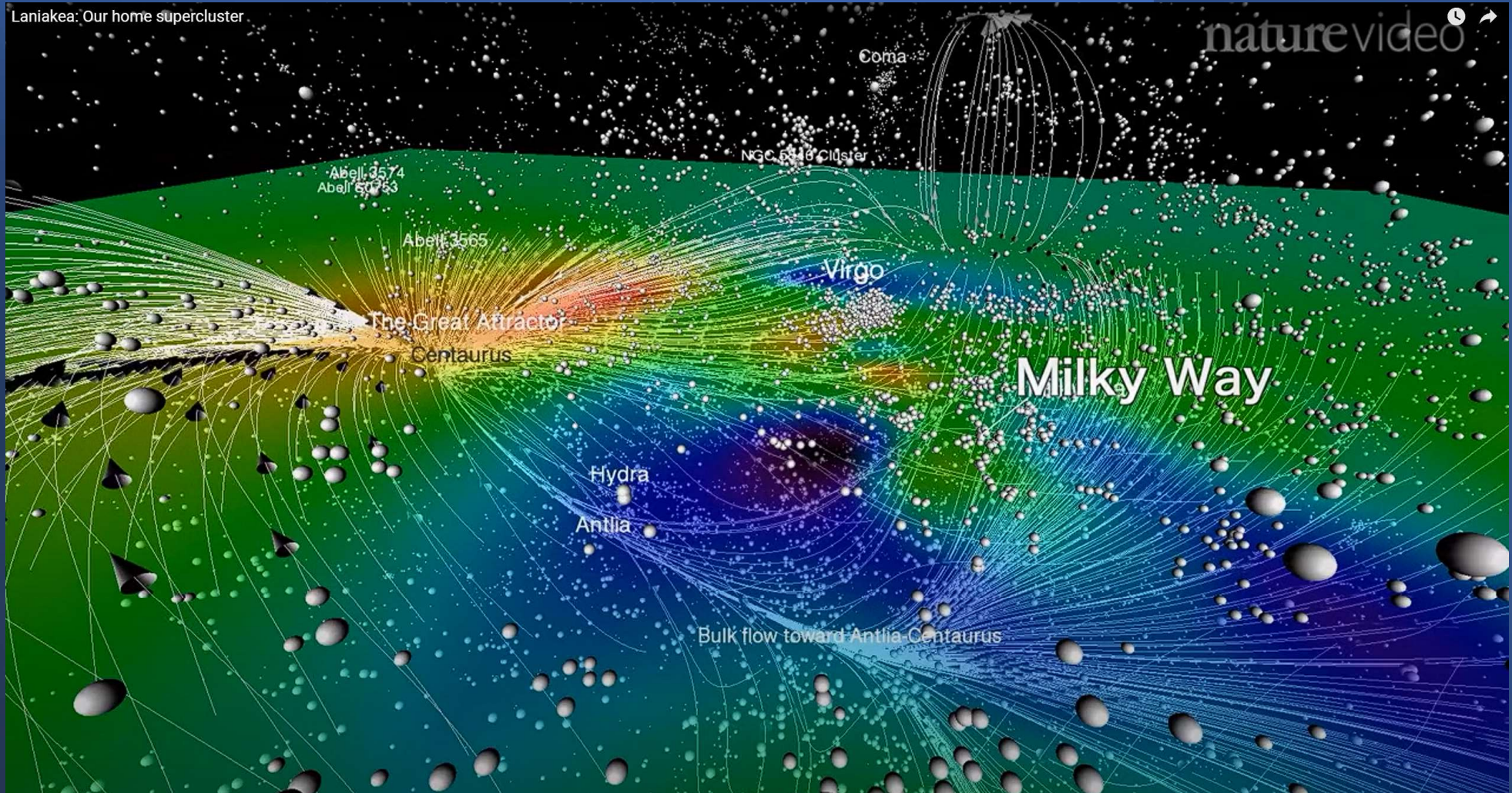
Χαμηλή Θερμοκρασία = Χαμηλό ηλεκτρονικό Θόρυβο

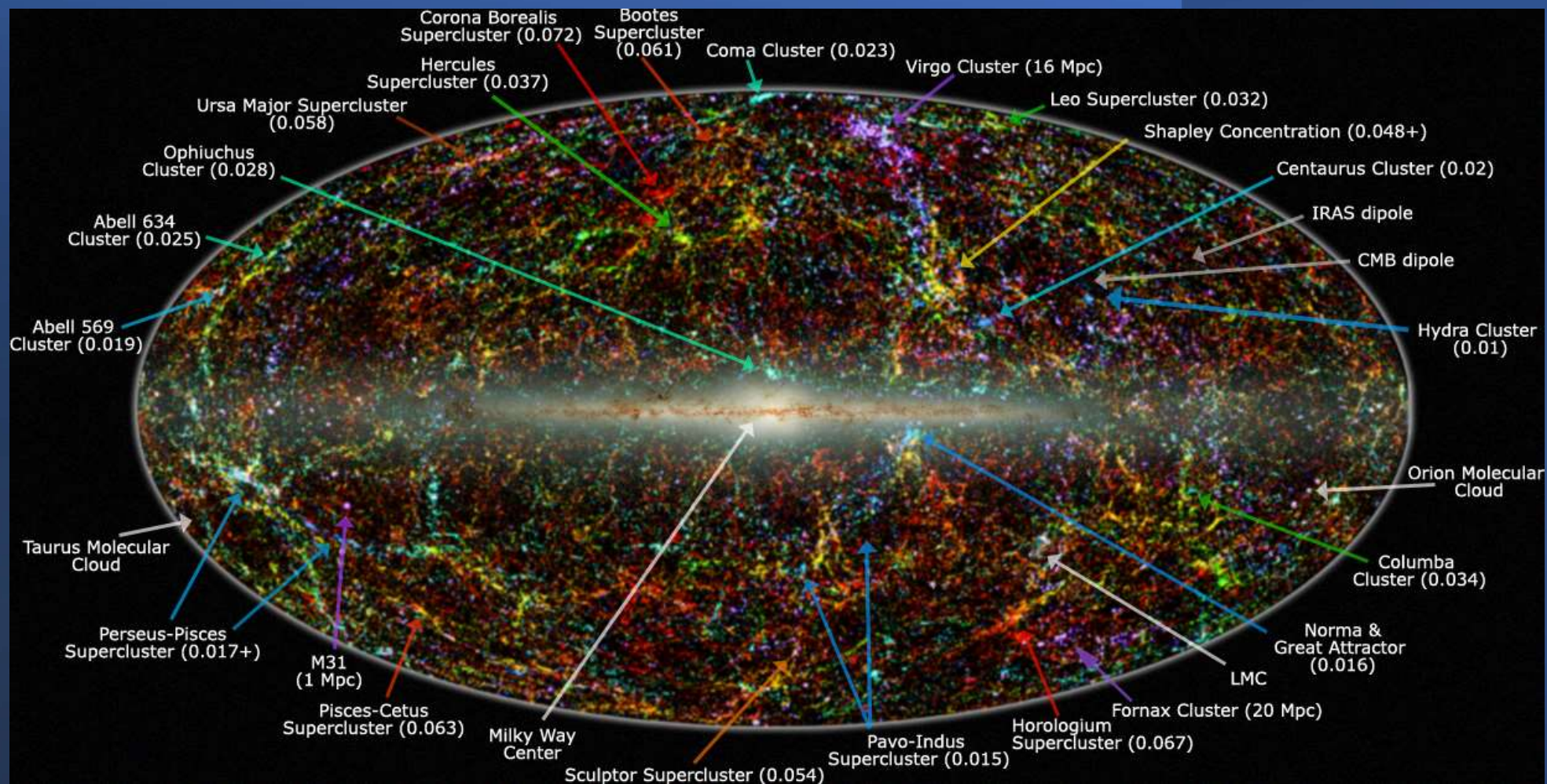


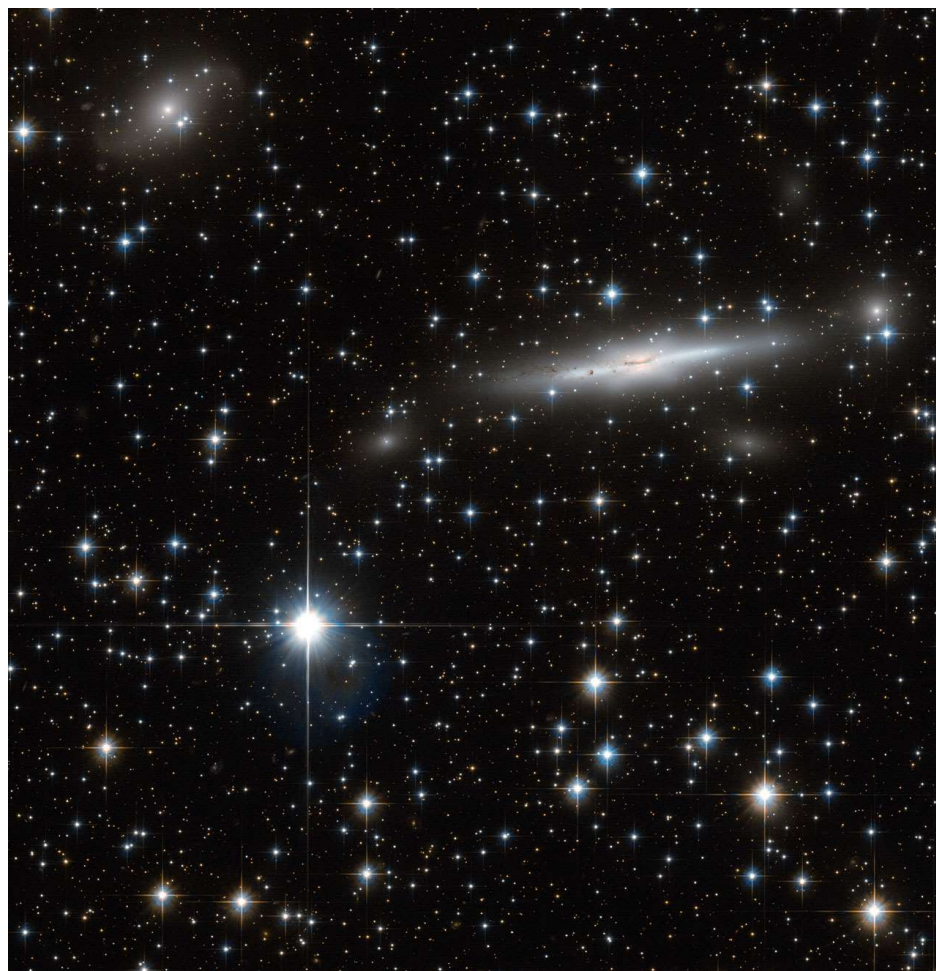


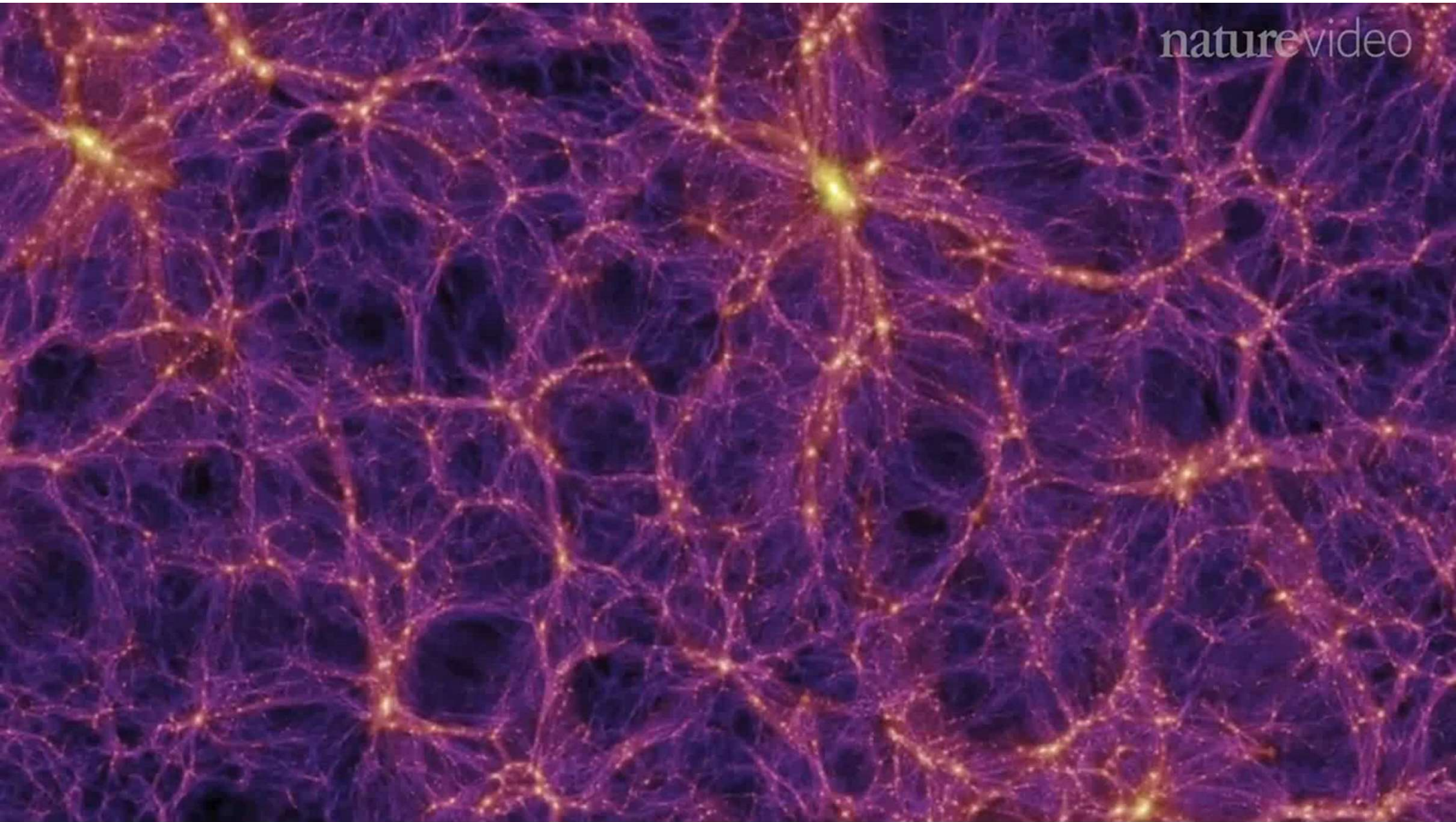
Laniakea: Our home supercluster

nature video

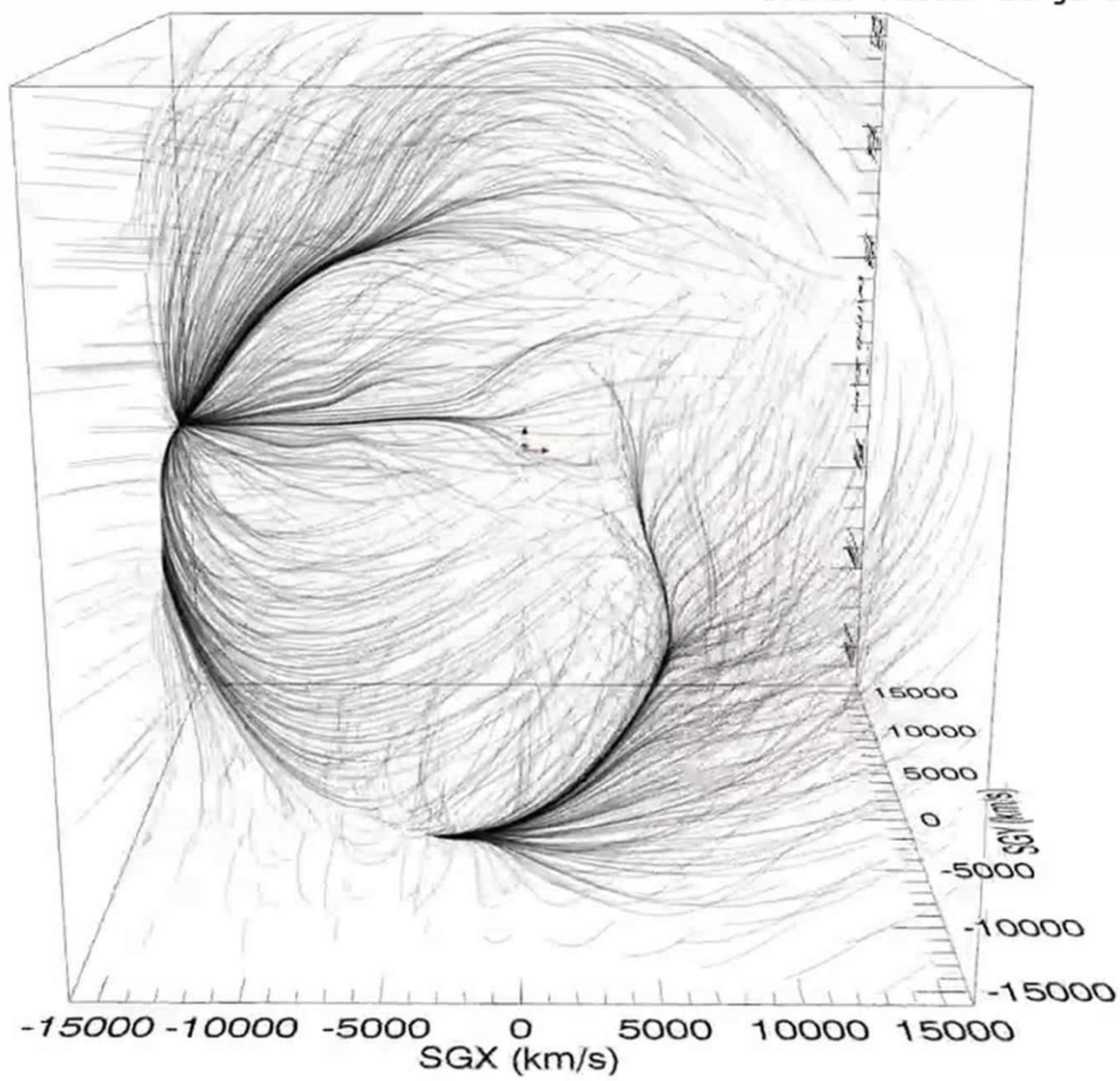


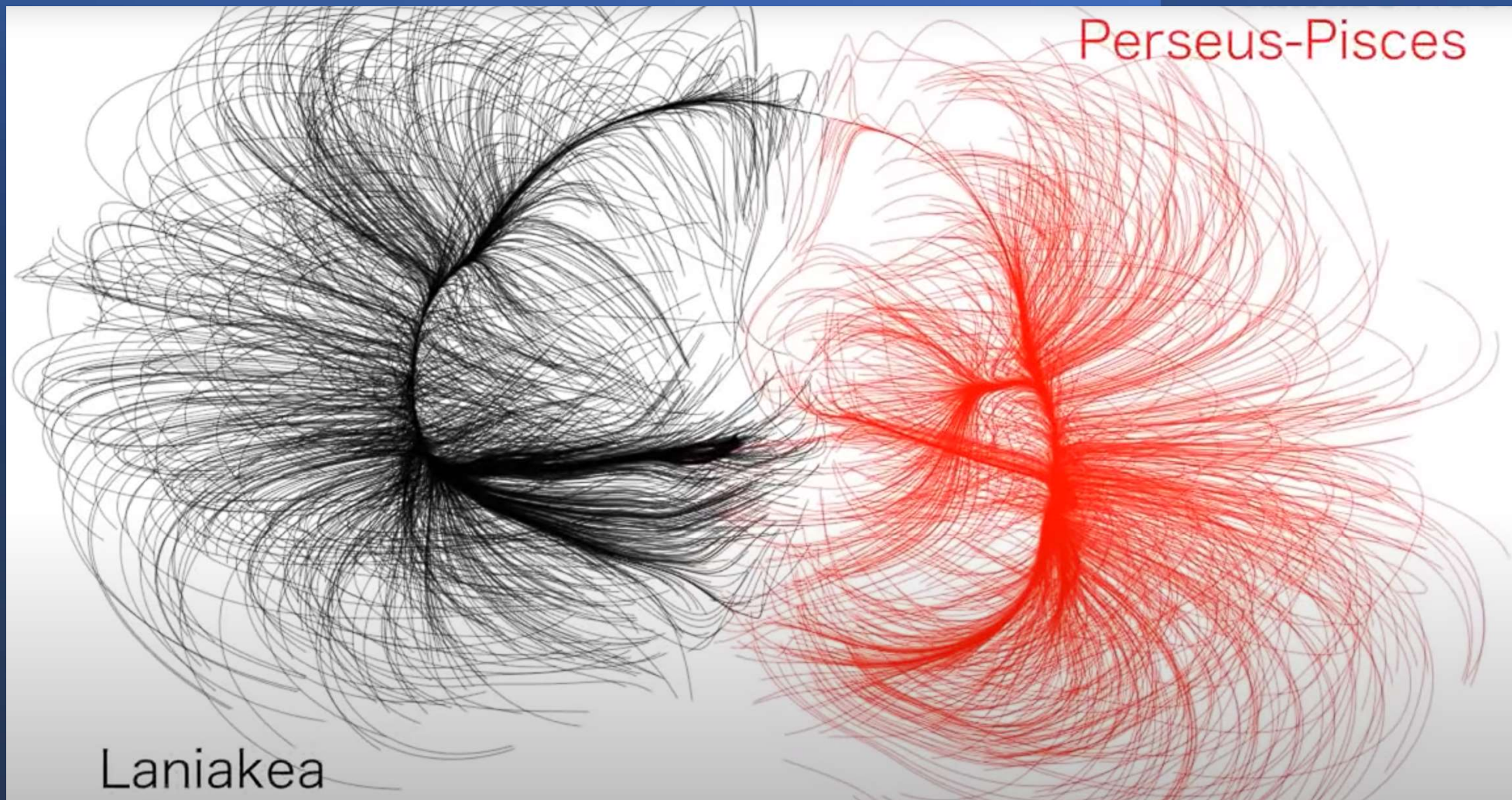


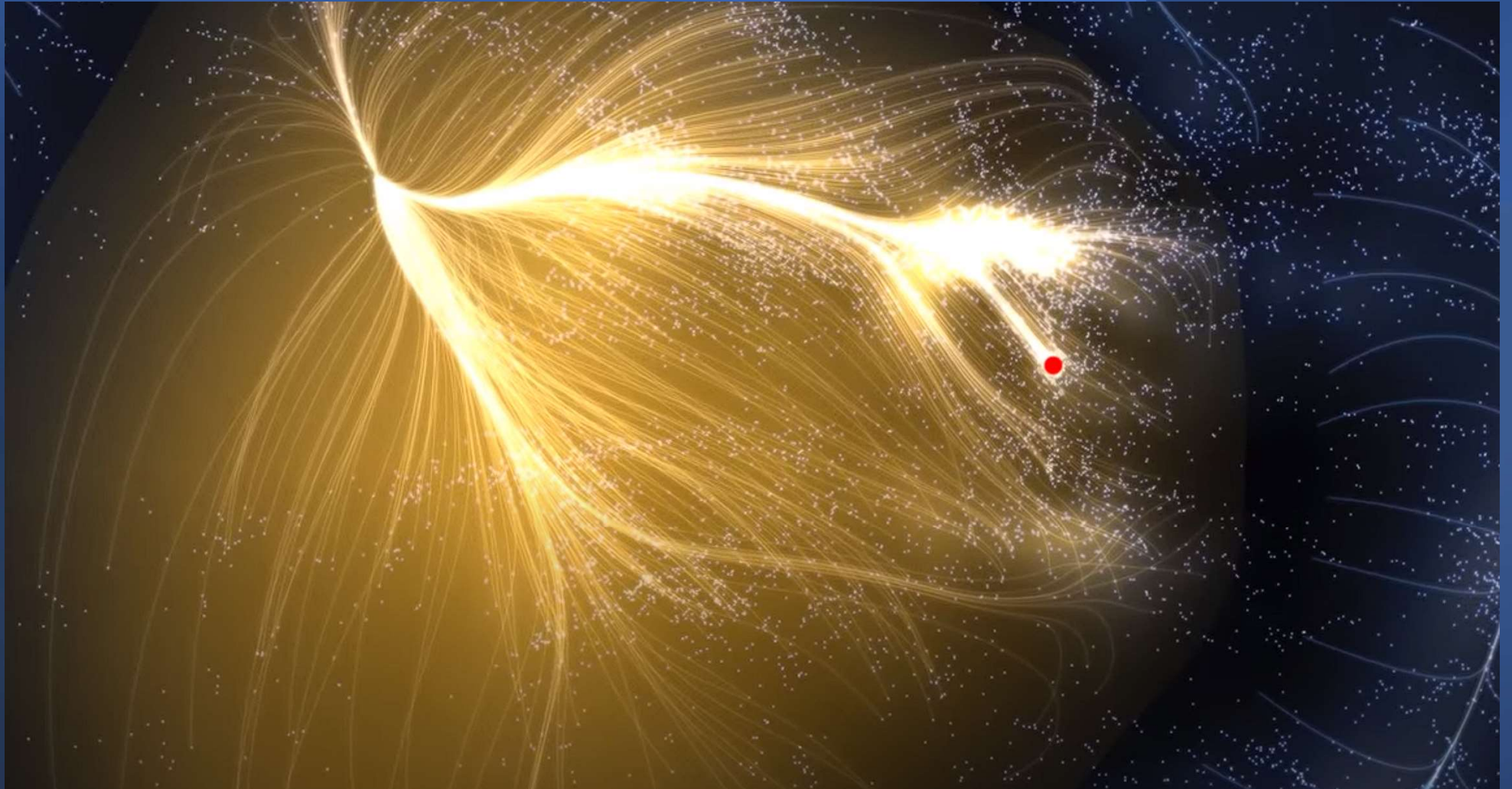




Wiener Filter Large Scale velocity flow lines







Smiling Face

