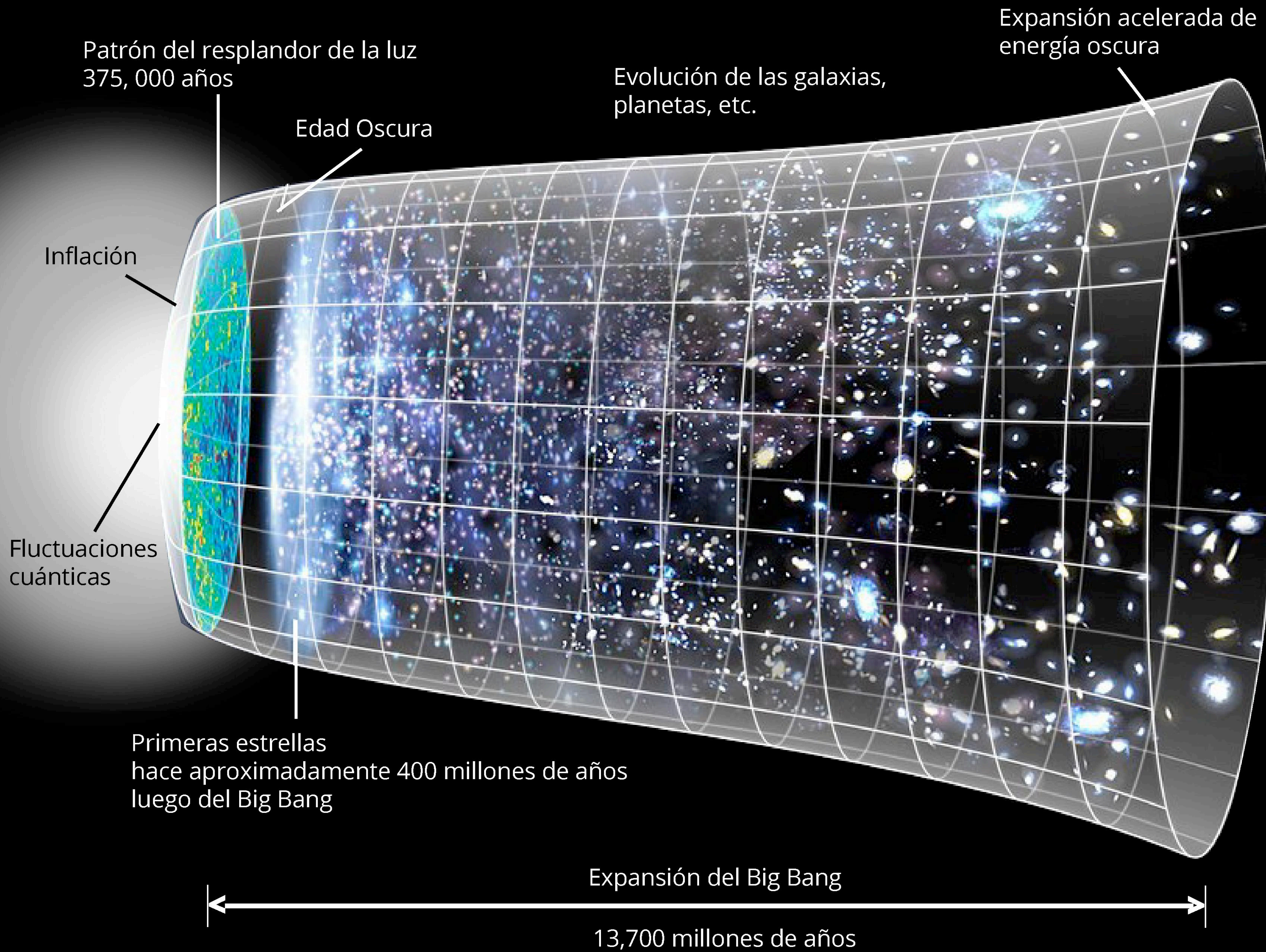


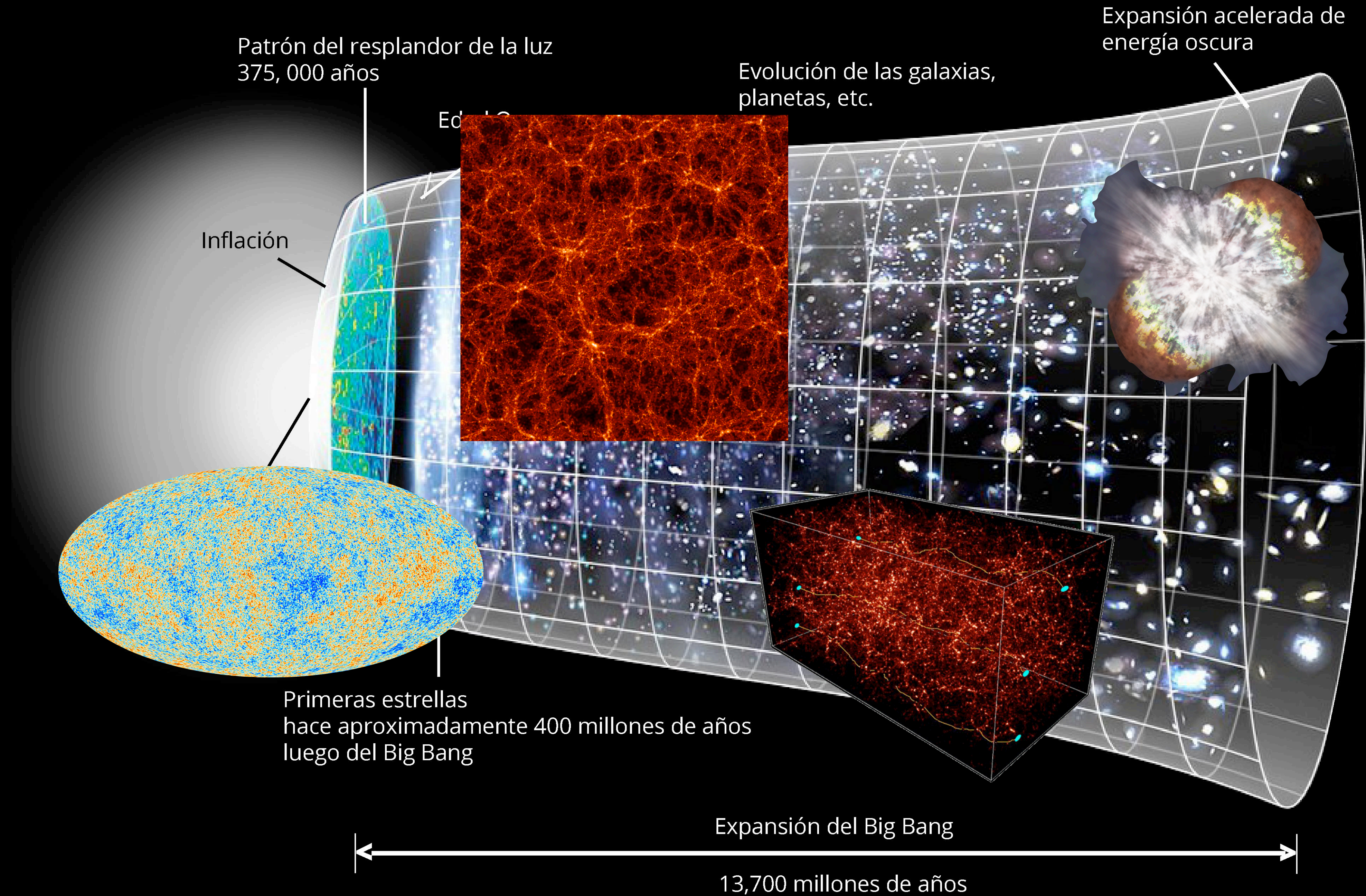
# Com llegim l'Univers?

Lluís Galbany

1r Ciència amb tirador, 18 Maig 2022, Anònims







Patrón del resplandor de la luz  
375,000 años

Evolución de las galaxias,  
planetas, etc.

Expansión acelerada de  
energía oscura

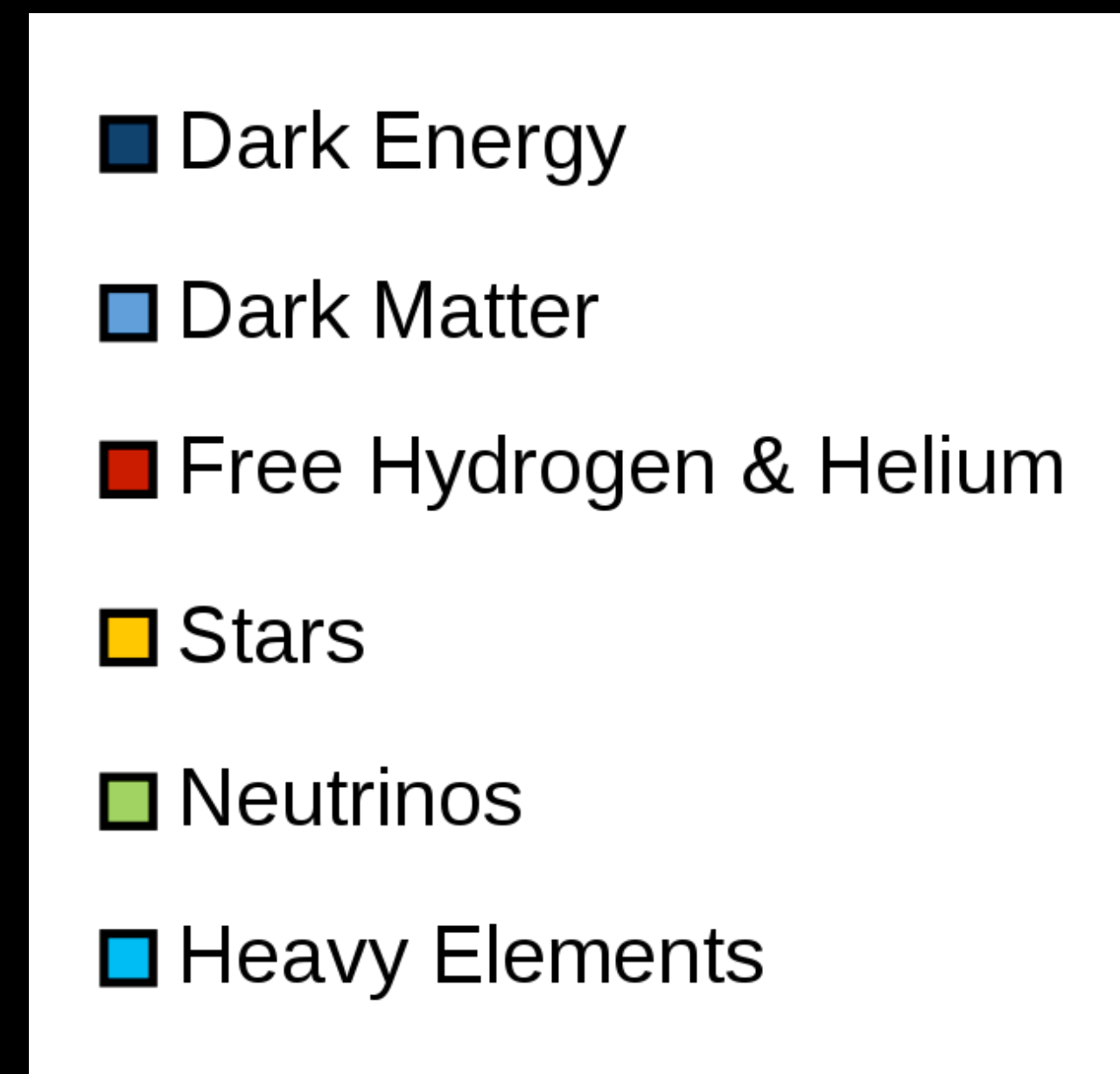
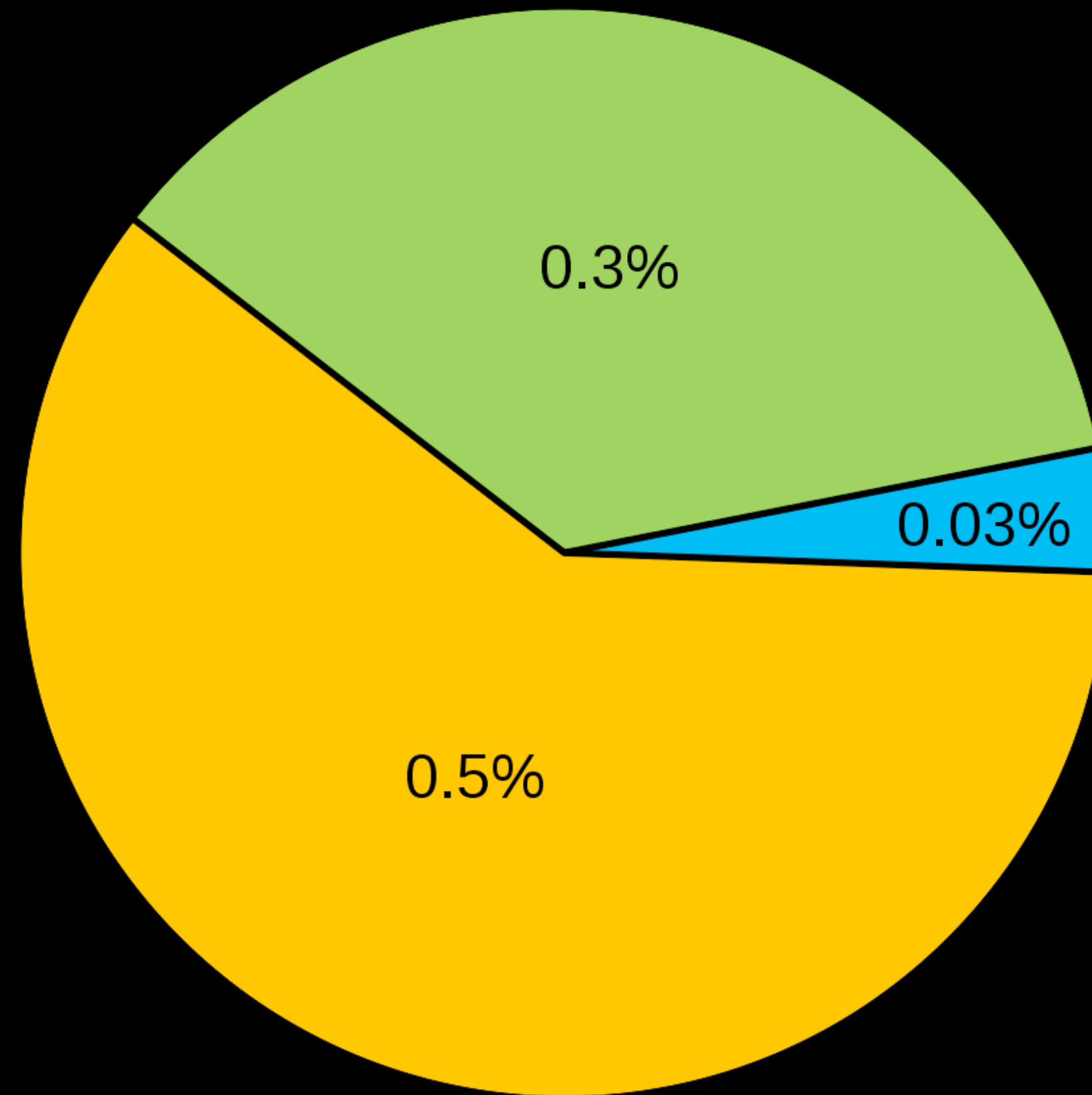
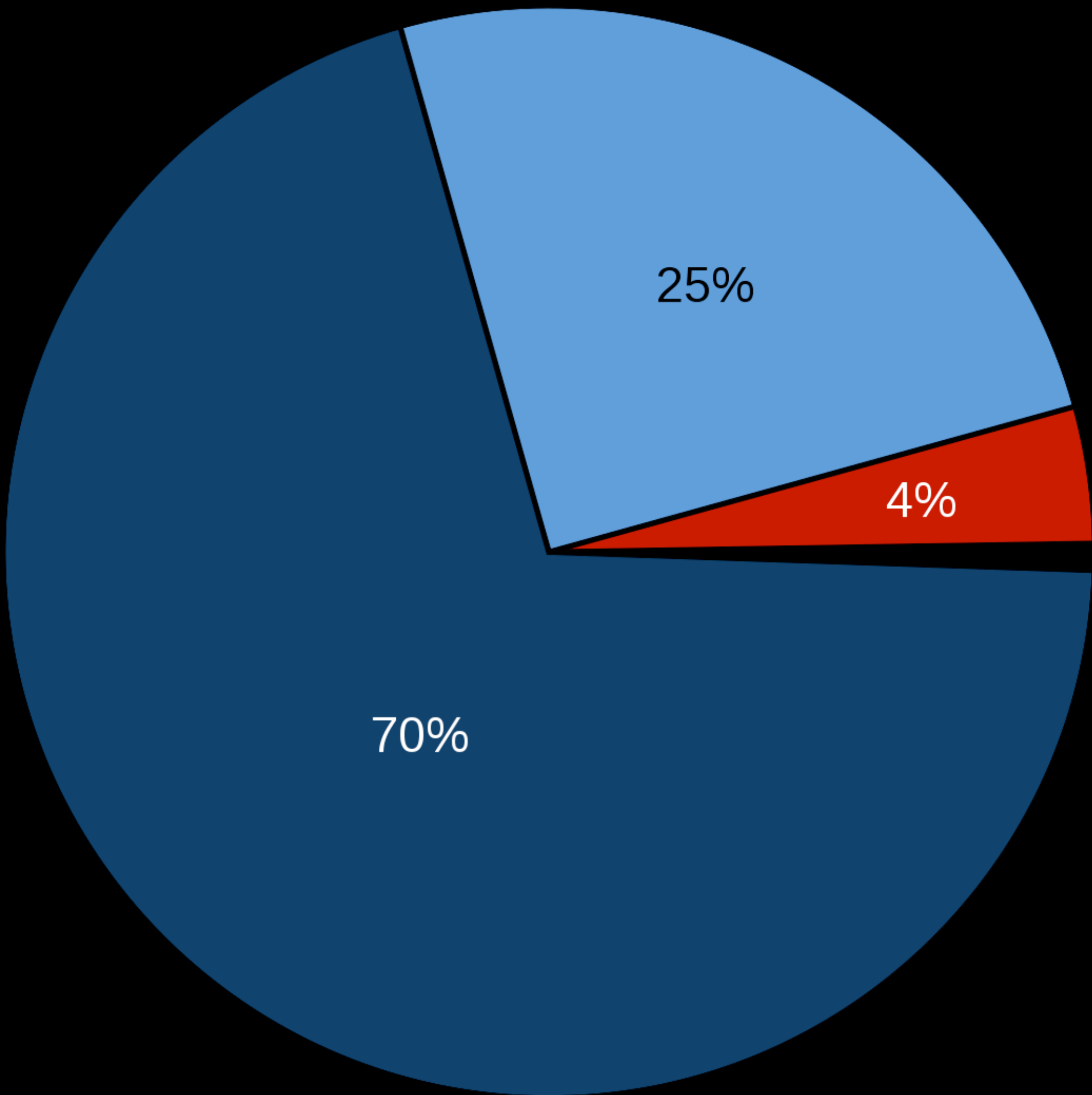
Inflación

Primeras estrellas  
hace aproximadamente 400 millones de años  
luego del Big Bang

Expansión del Big Bang

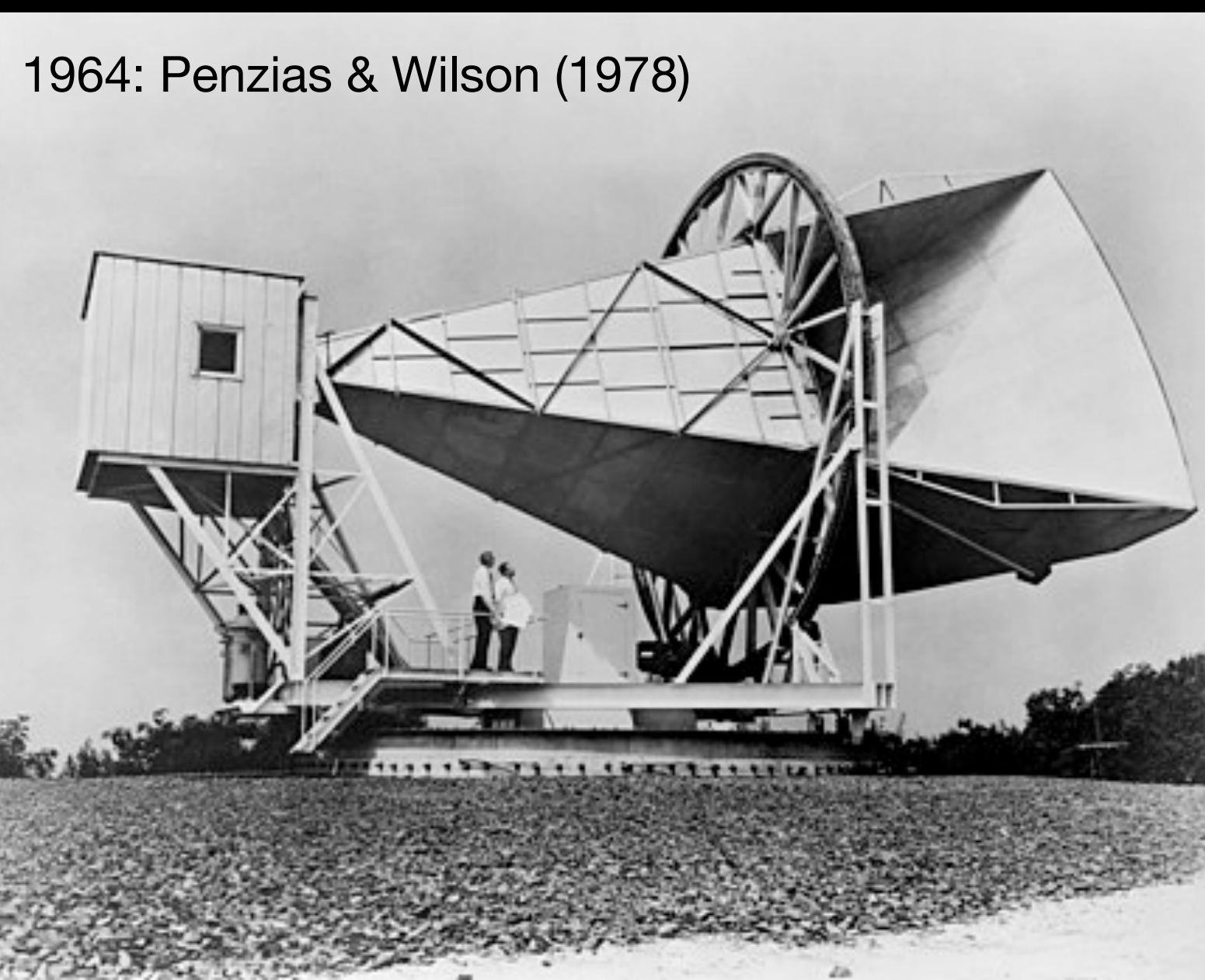
13,700 millones de años

# LCDM



# CMB

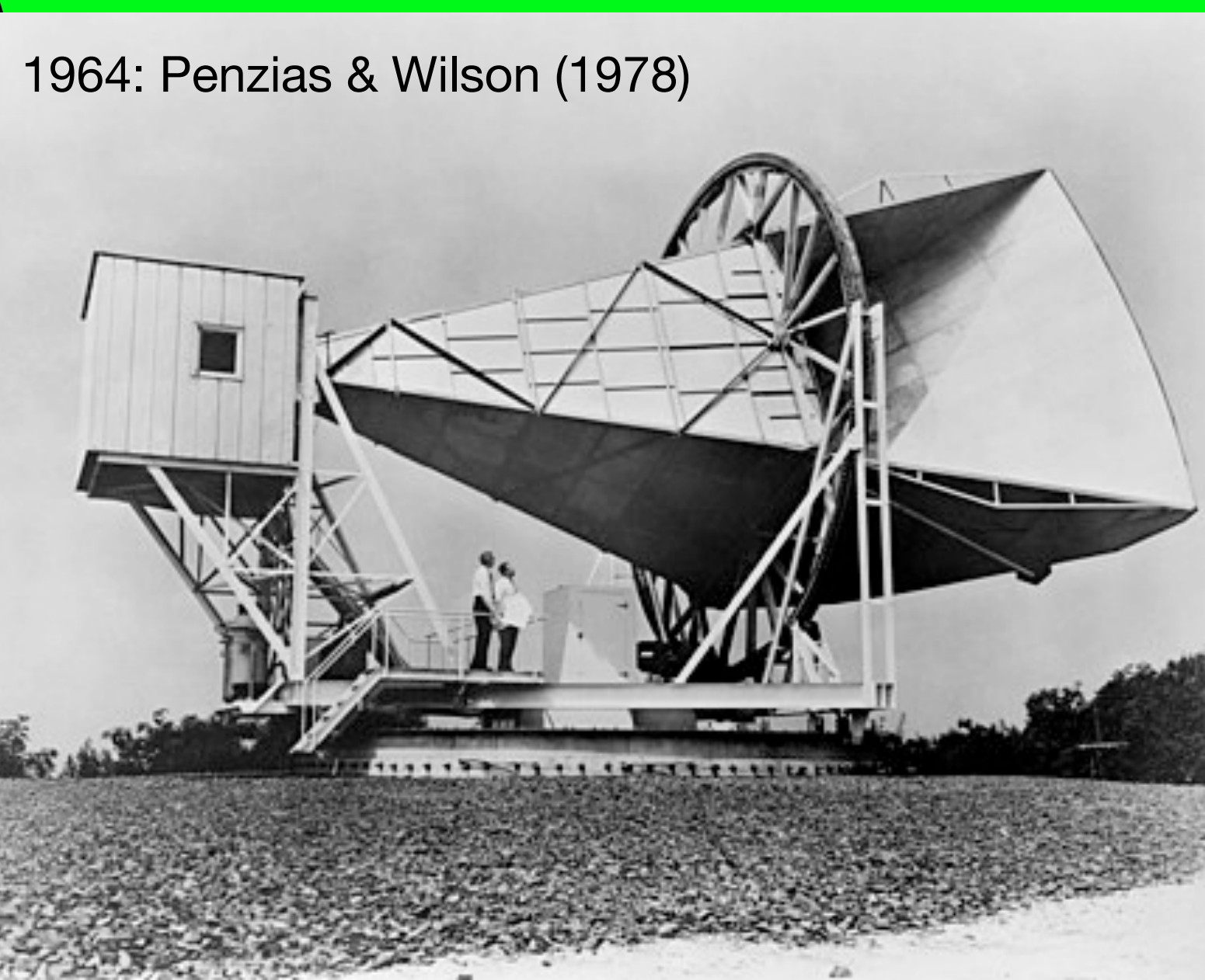
1964: Penzias & Wilson (1978)



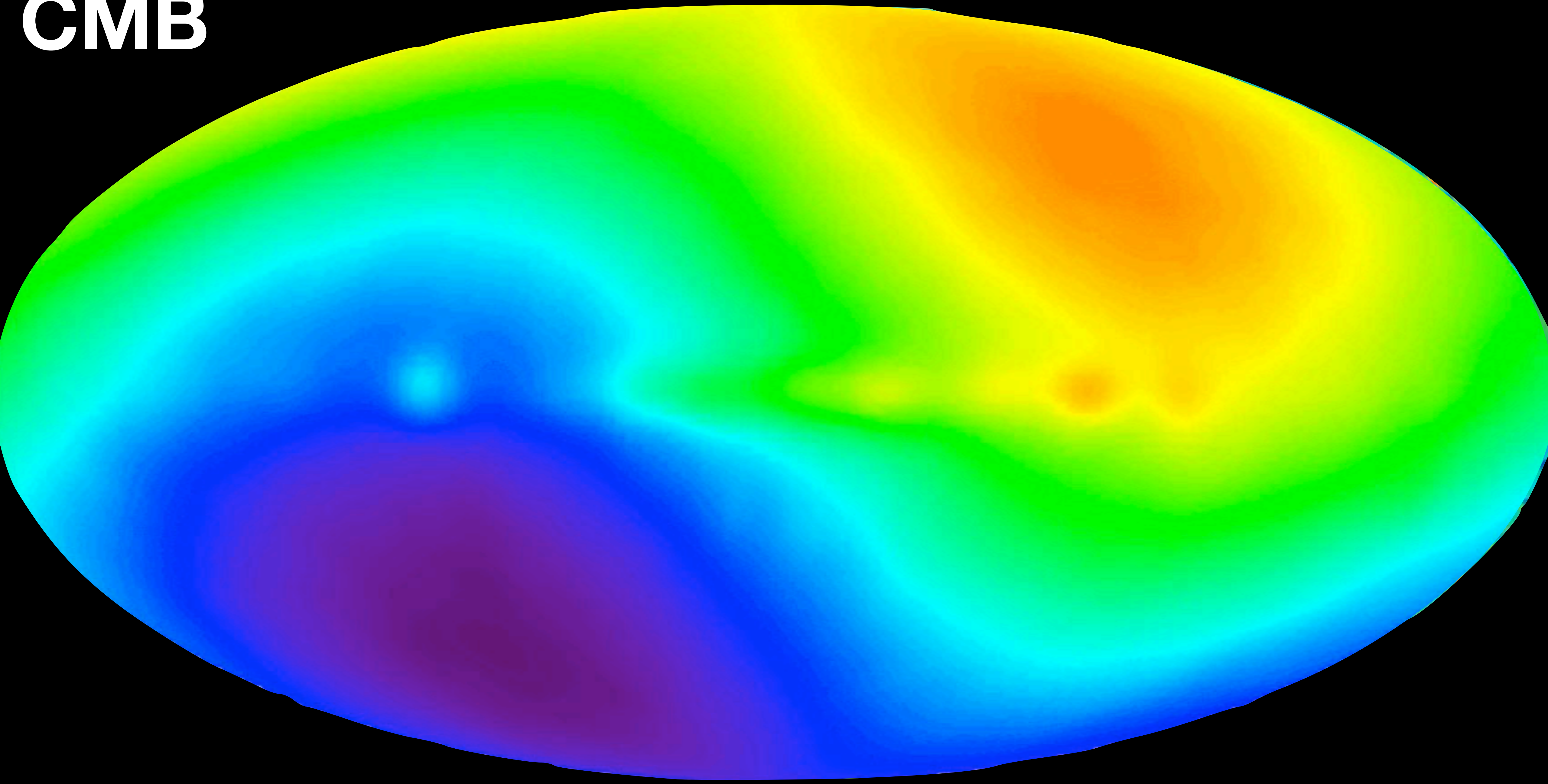
# CMB

**2,7 K = -270 C**

1964: Penzias & Wilson (1978)

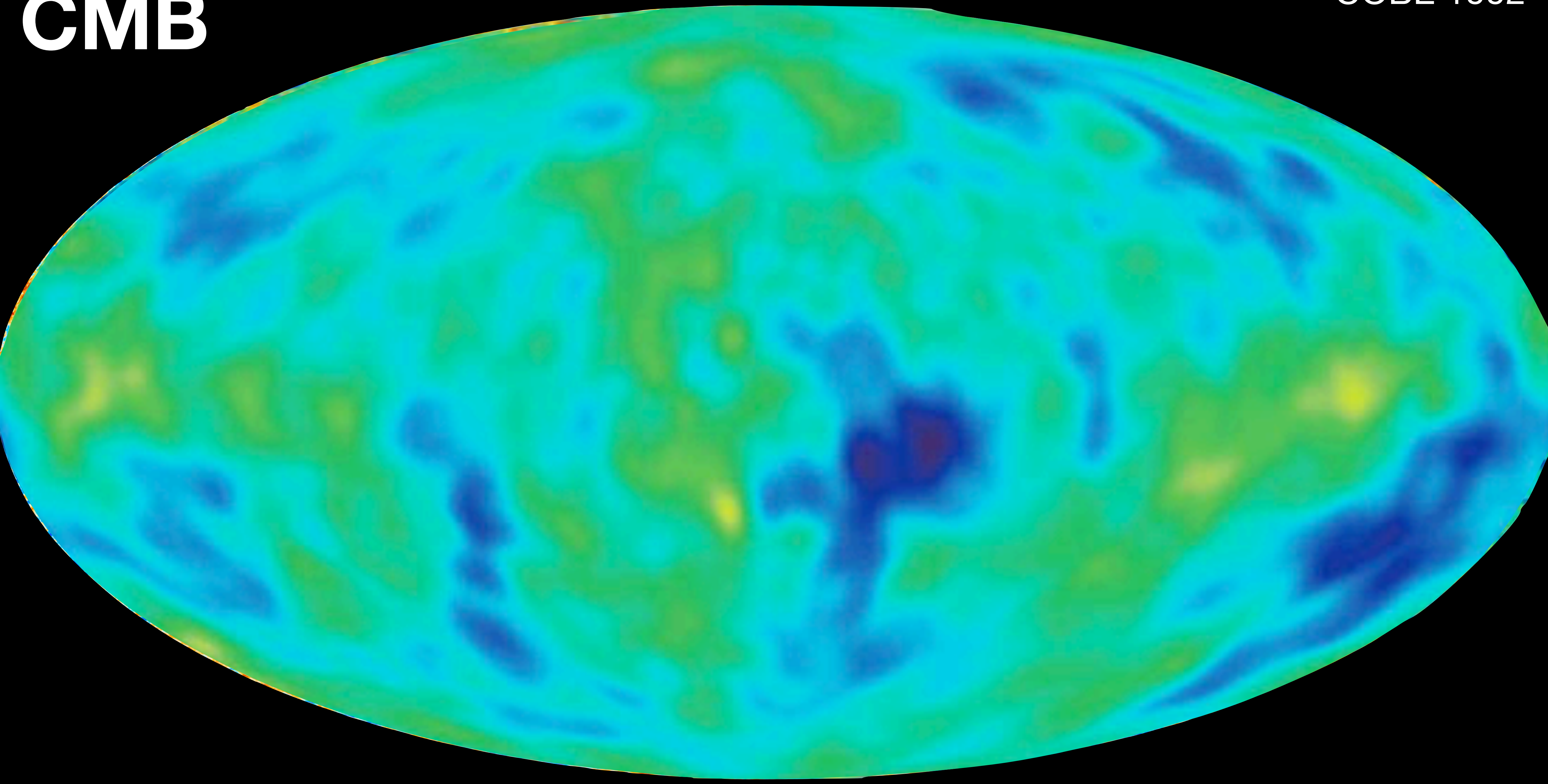


**CMB**



**CMB**

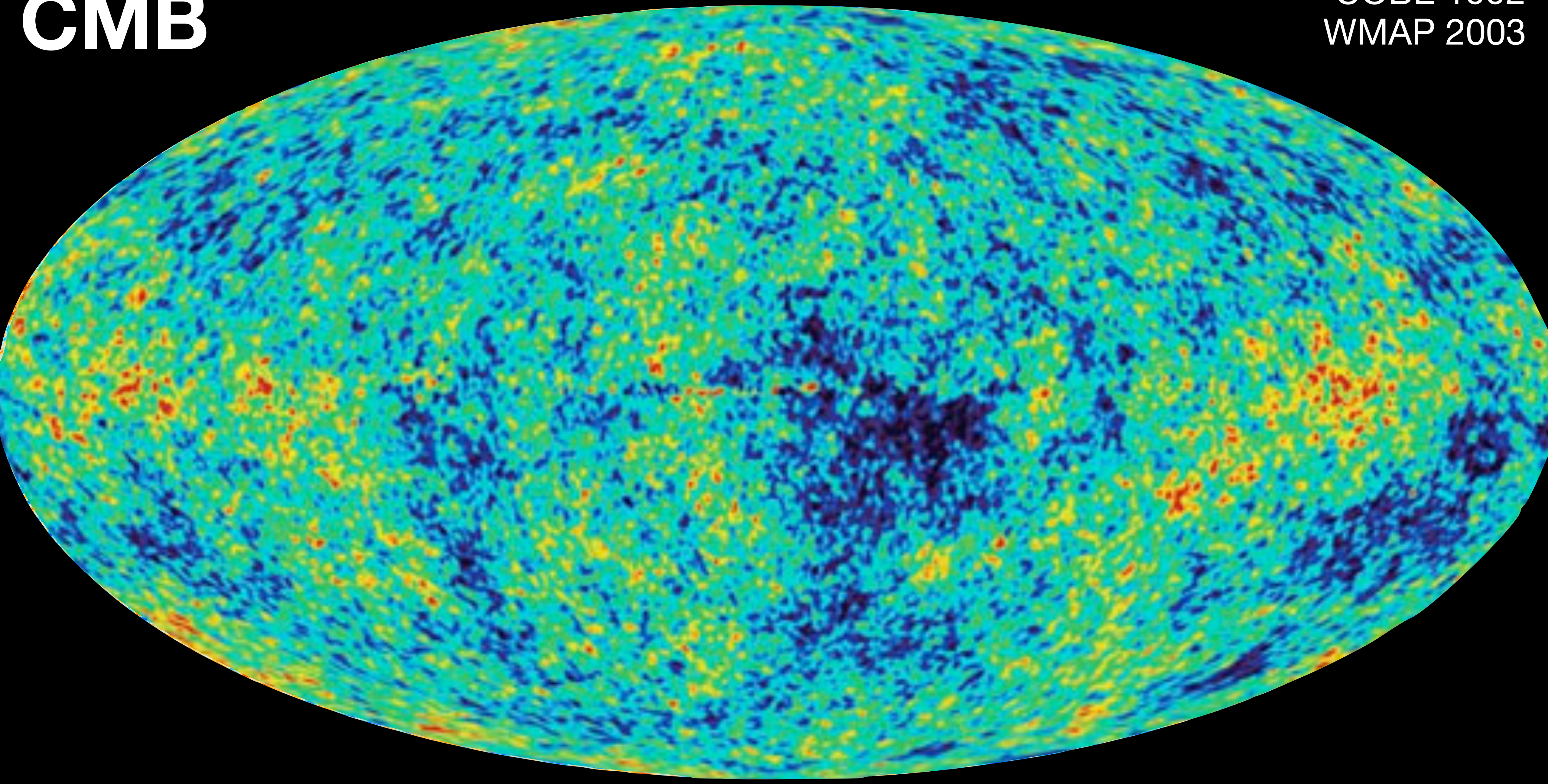
COBE 1992





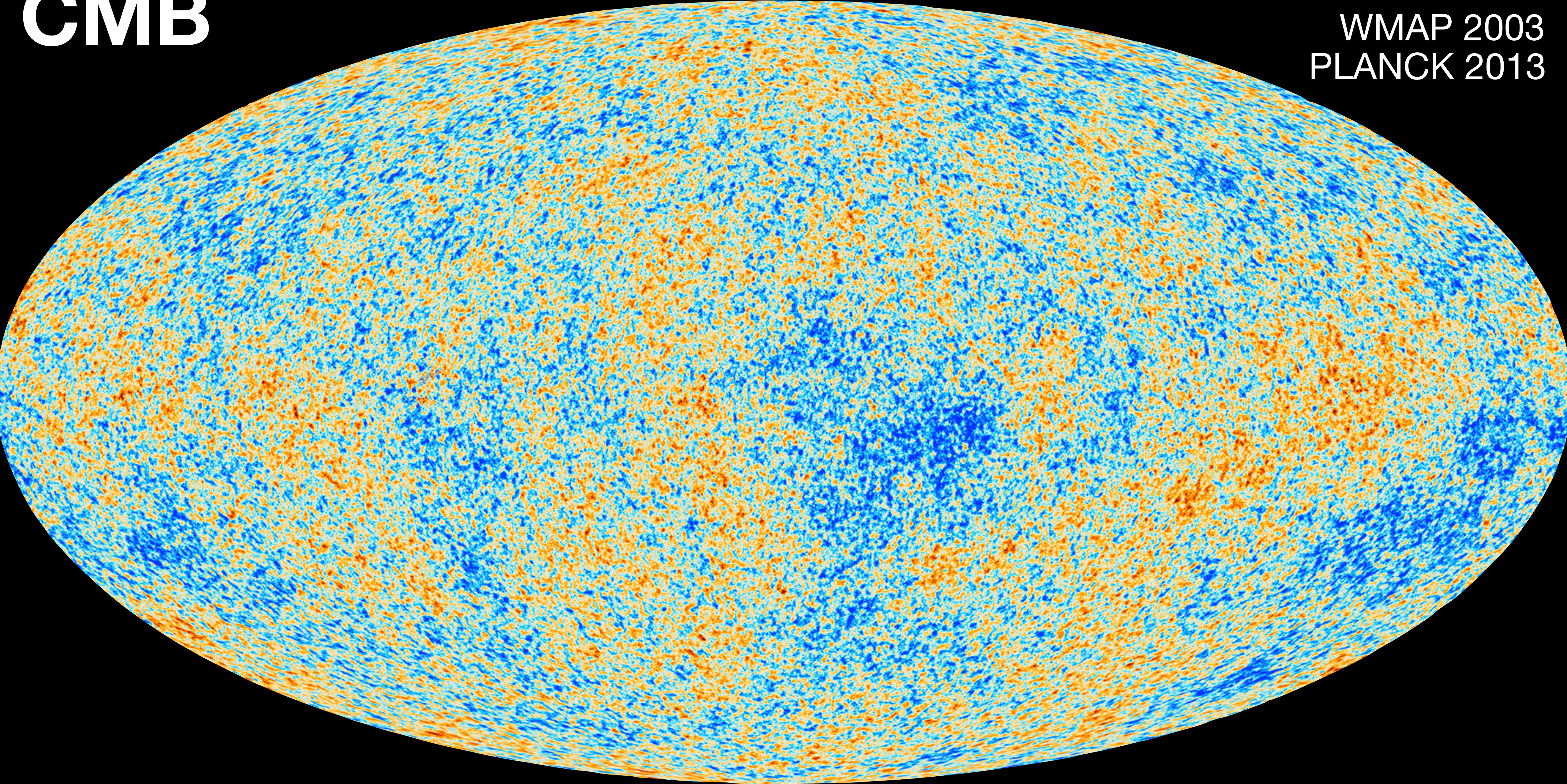
**CMB**

COBE 1992  
WMAP 2003

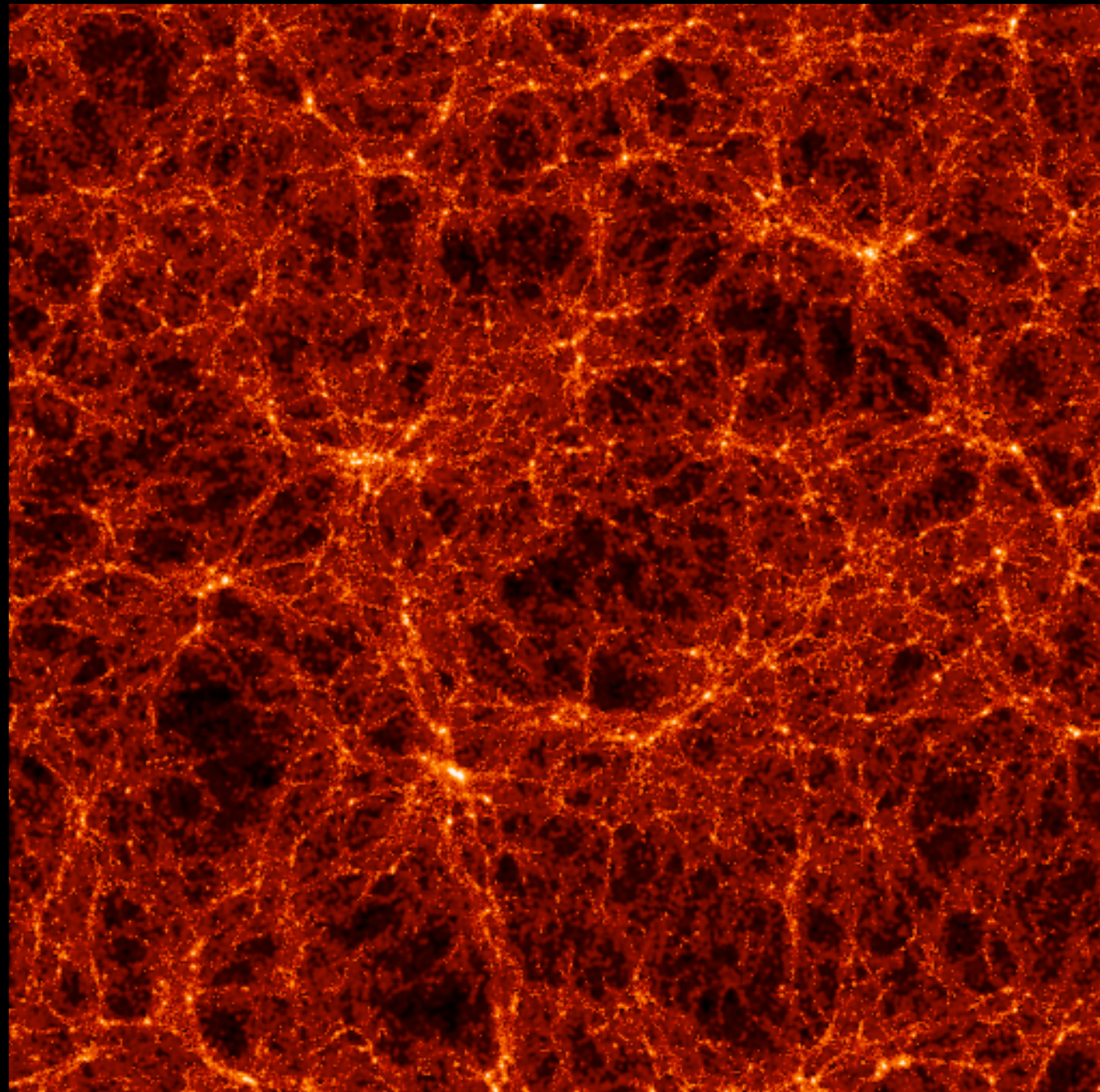


# CMB

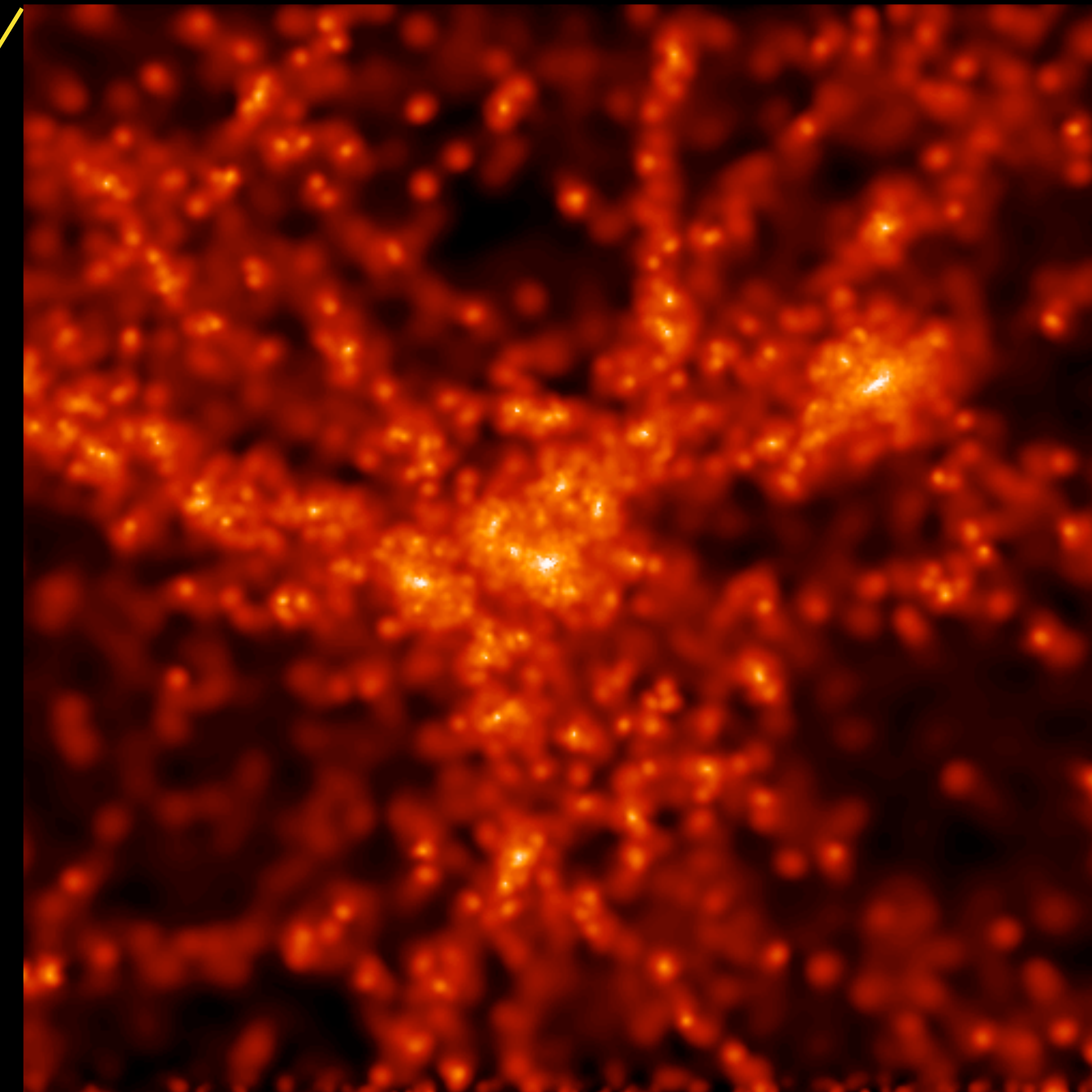
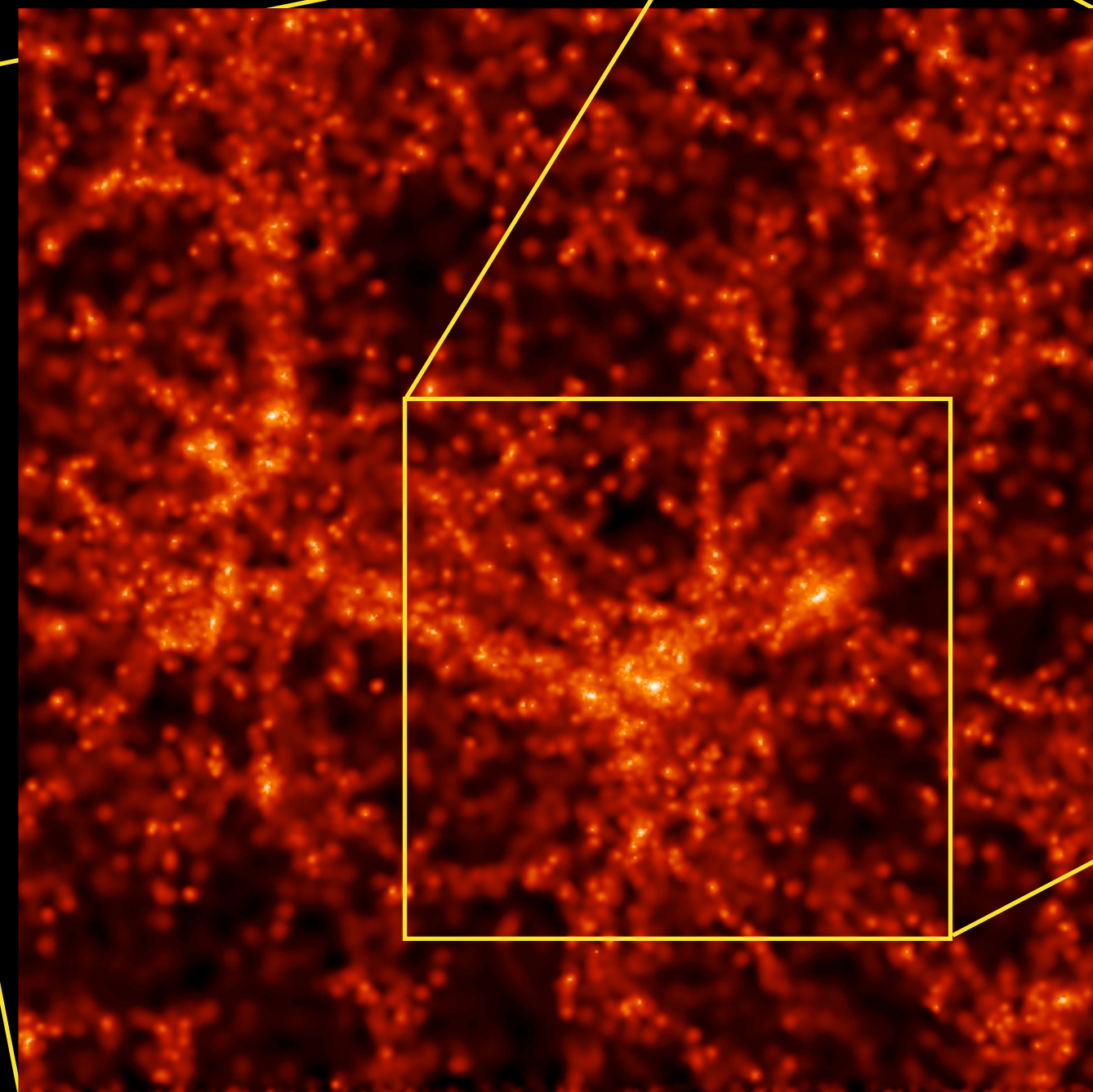
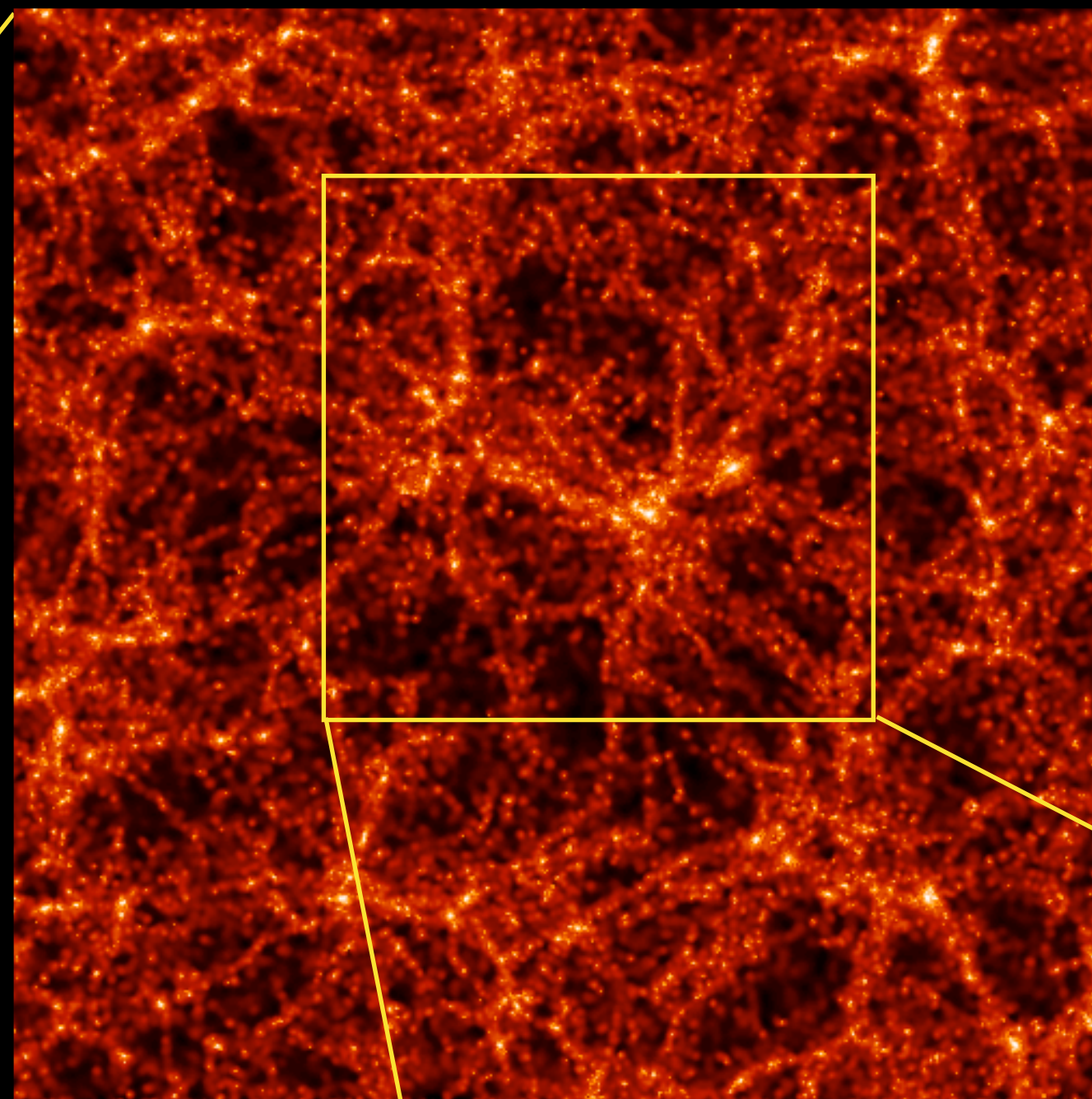
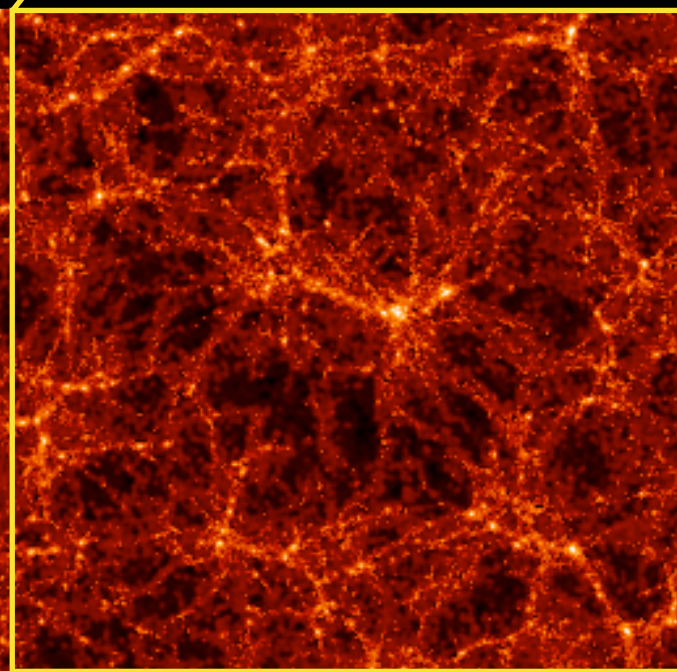
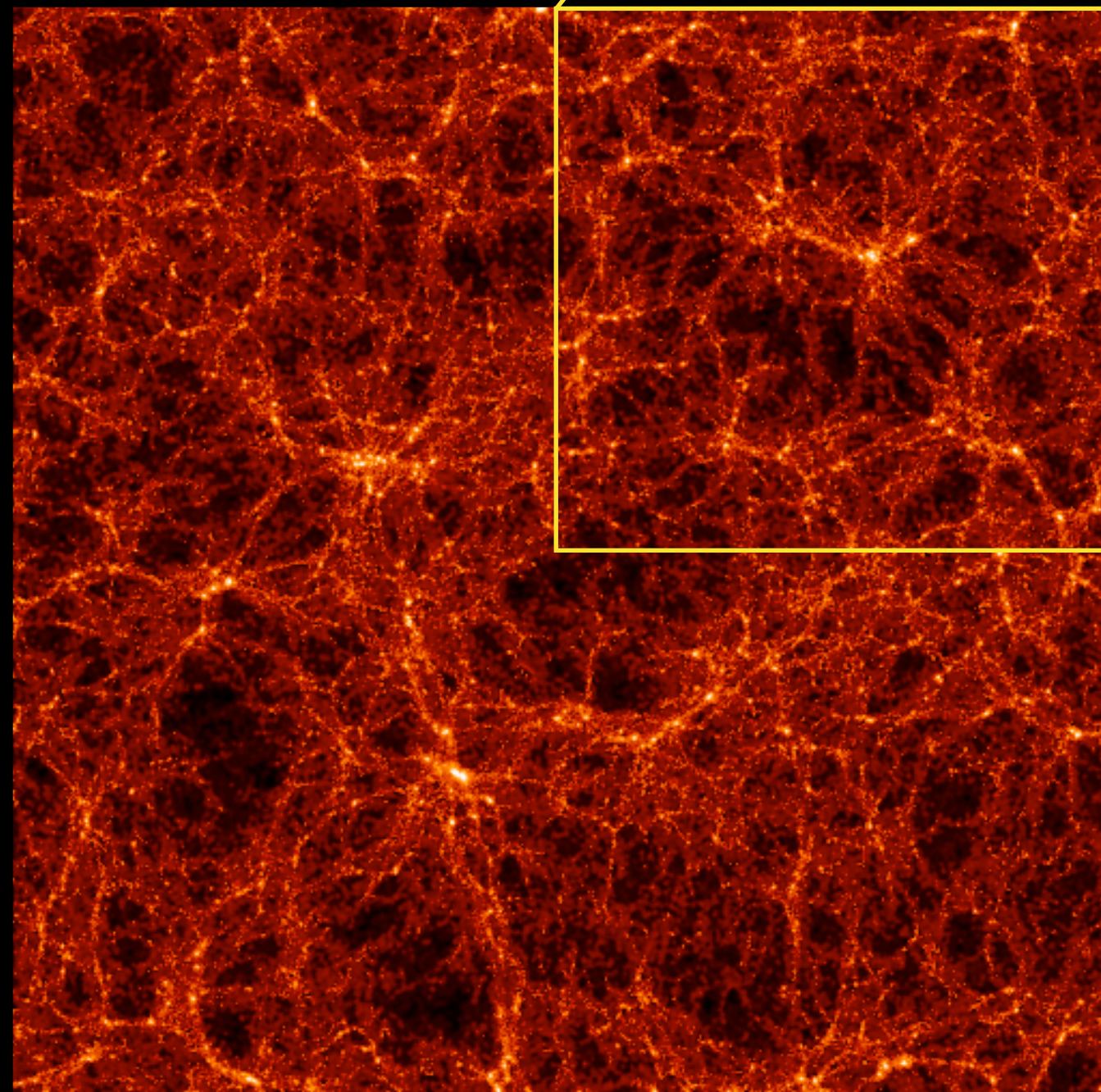
COBE 1992  
WMAP 2003  
PLANCK 2013



# LSS



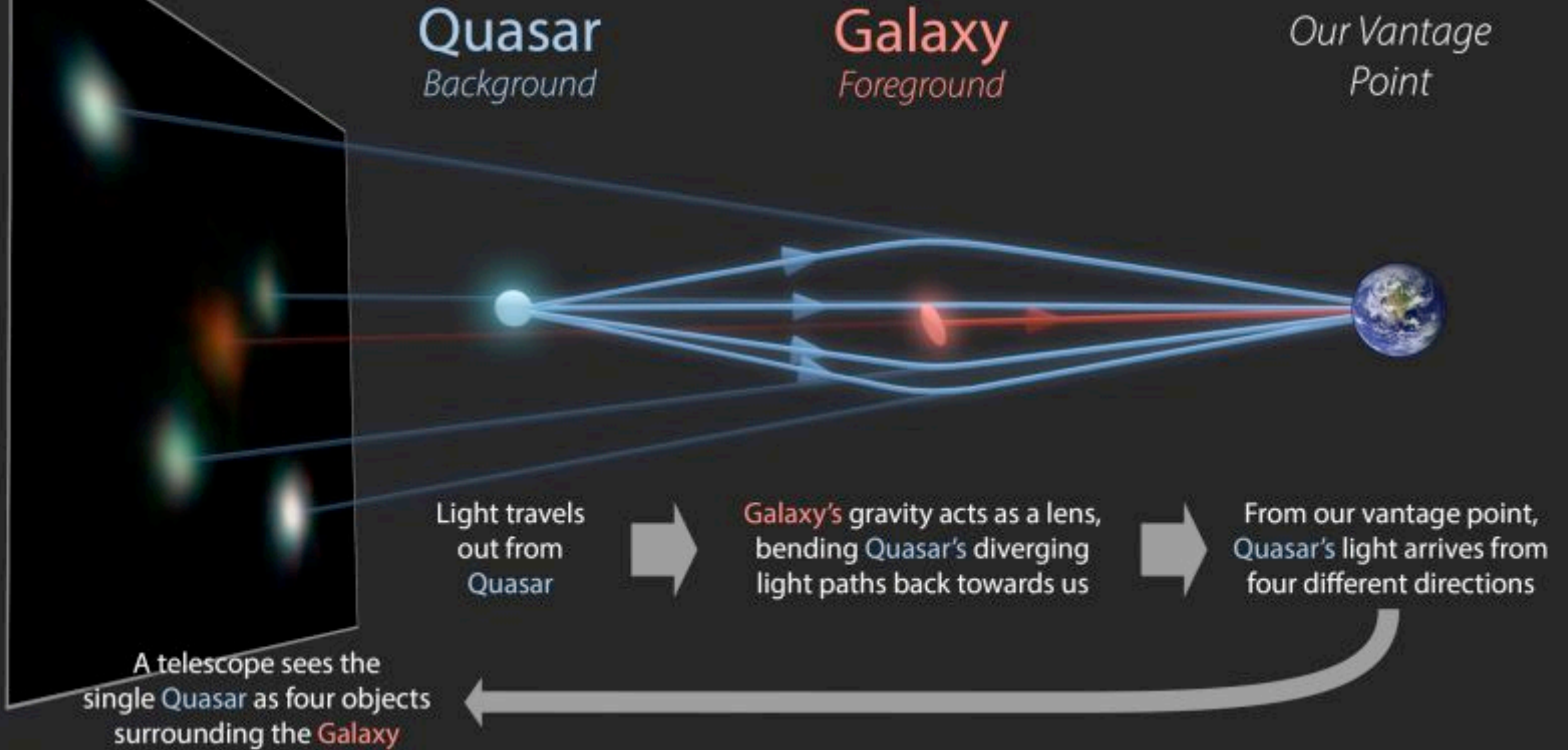
# LSS



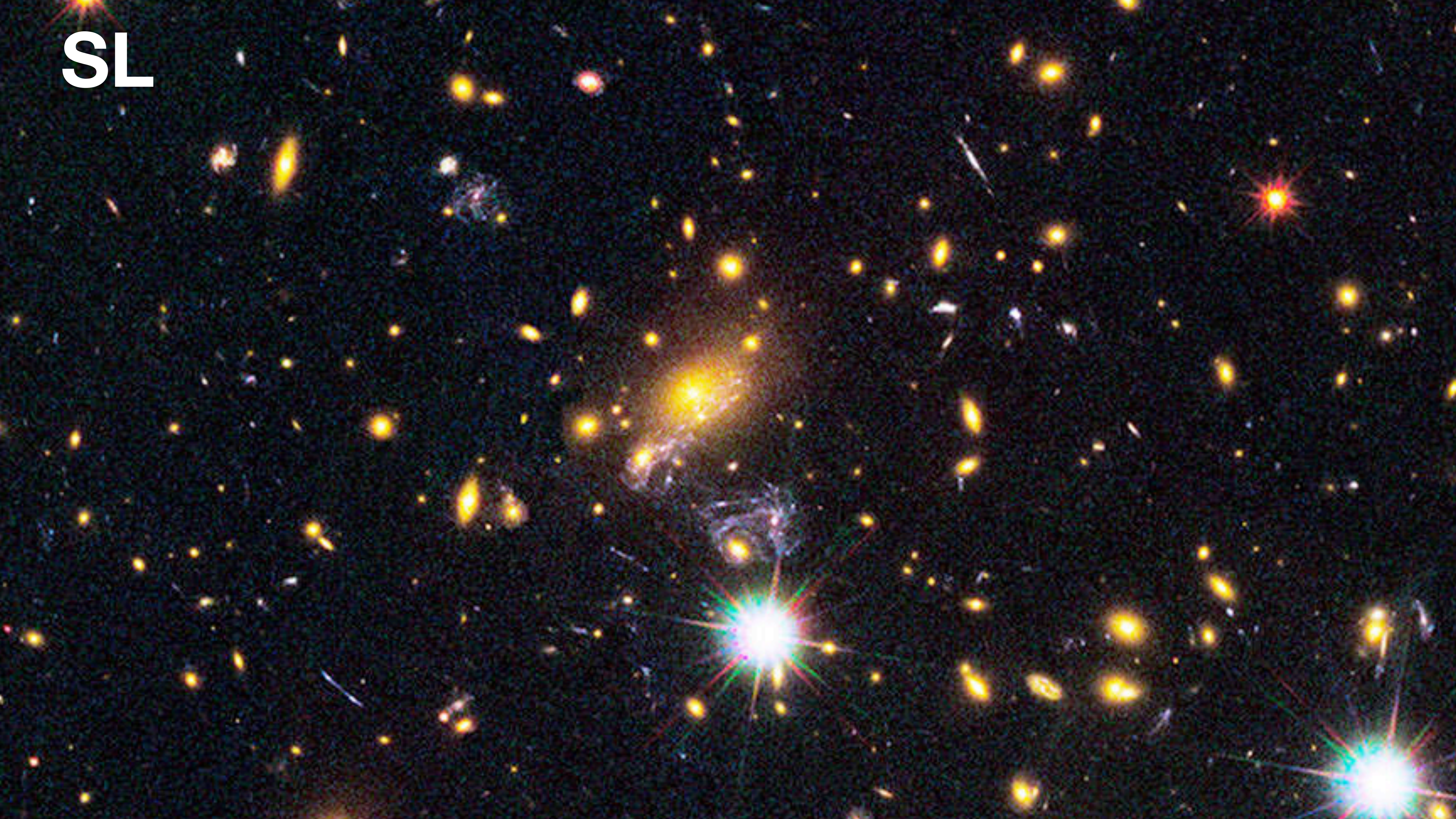
SL



# SL



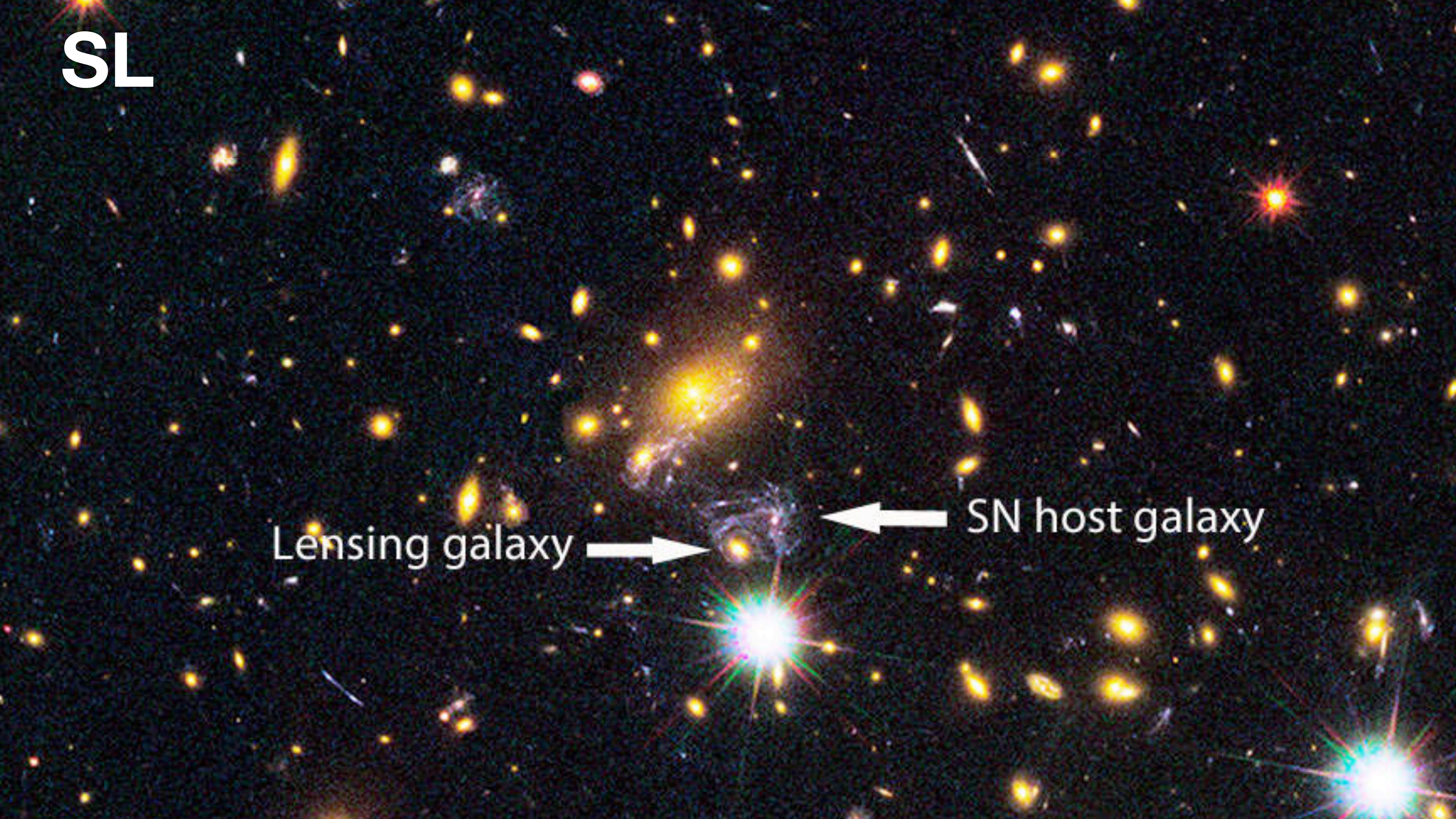
SL



SL

Lensing galaxy →

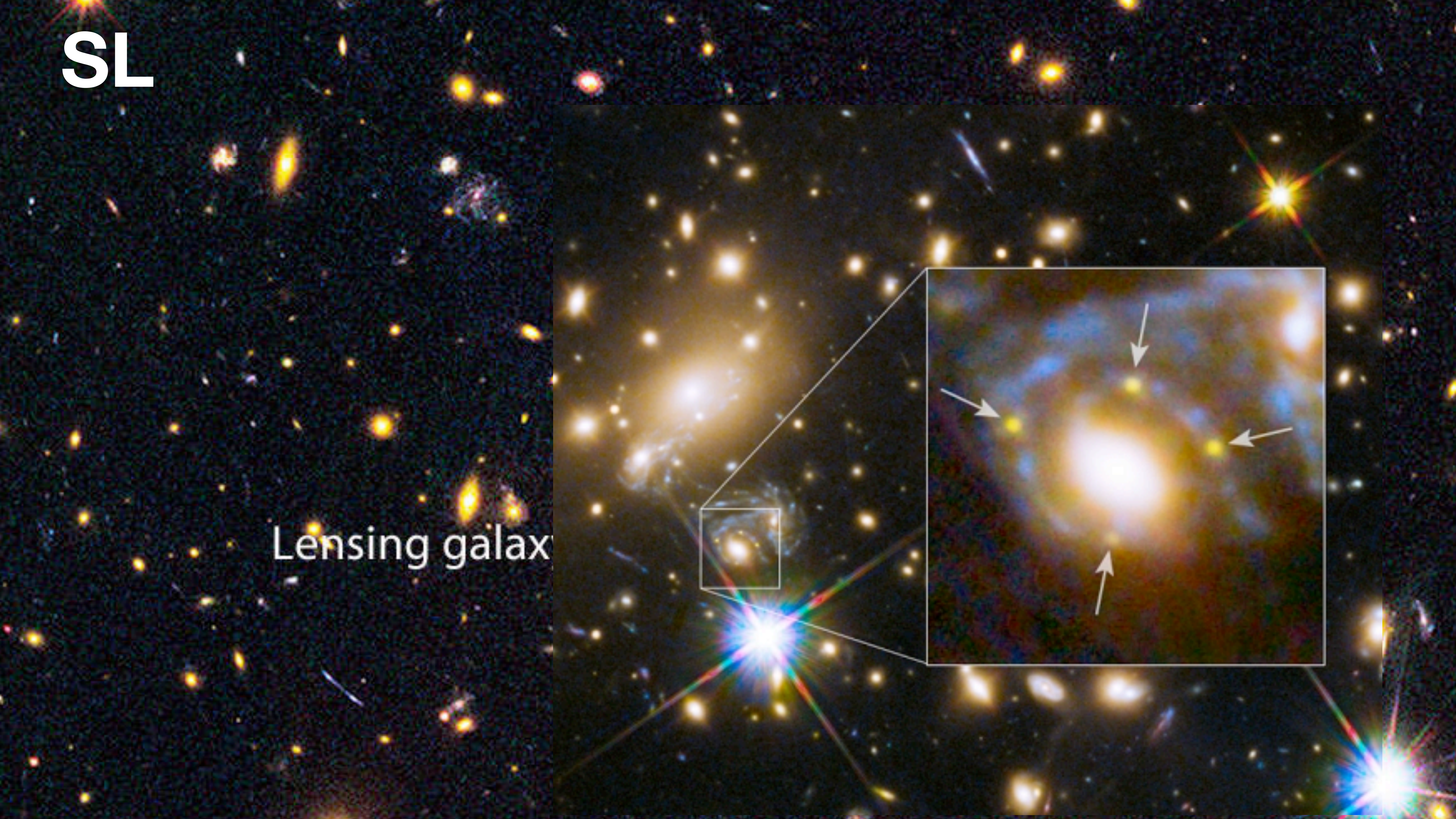
← SN host galaxy





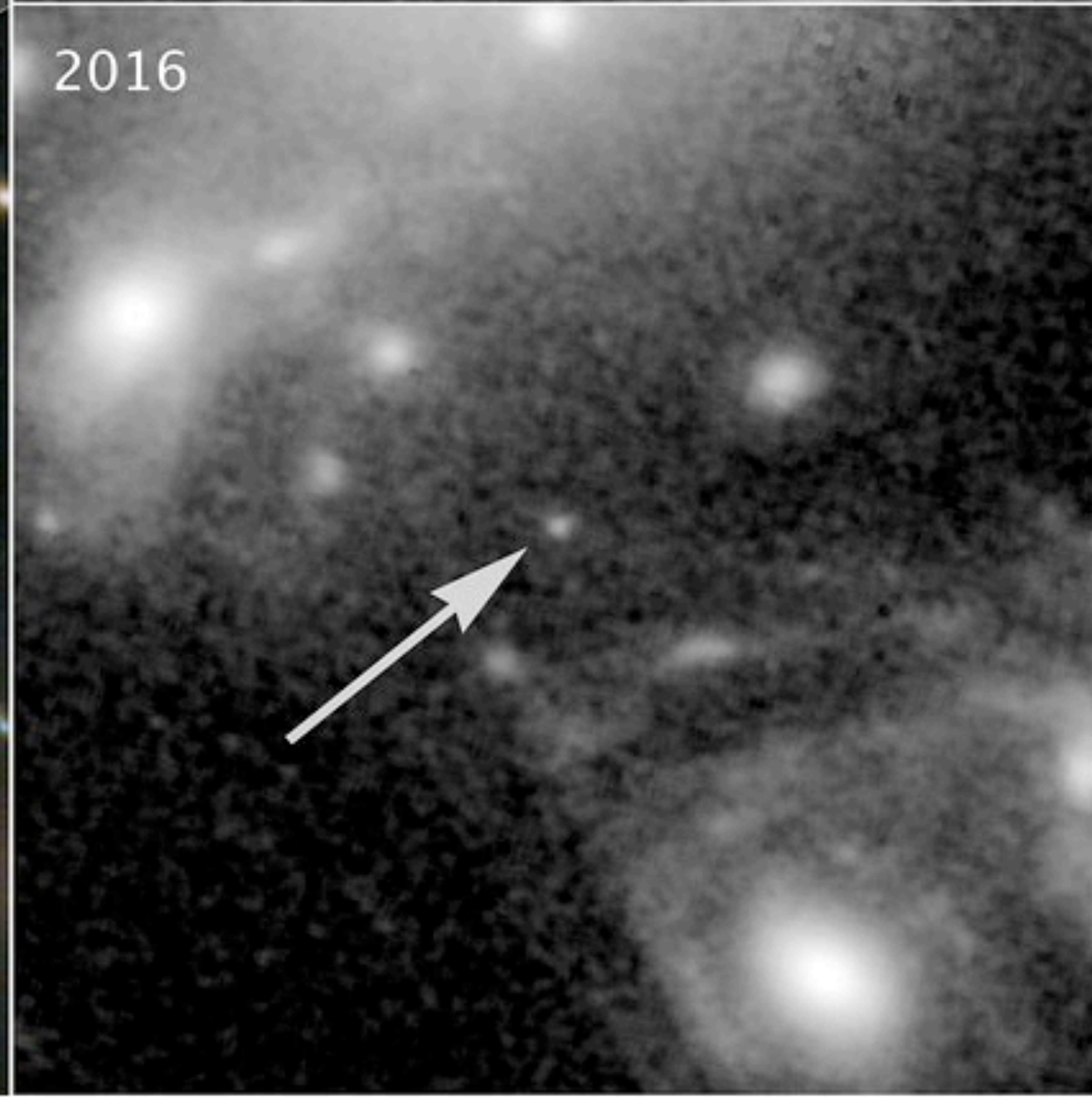
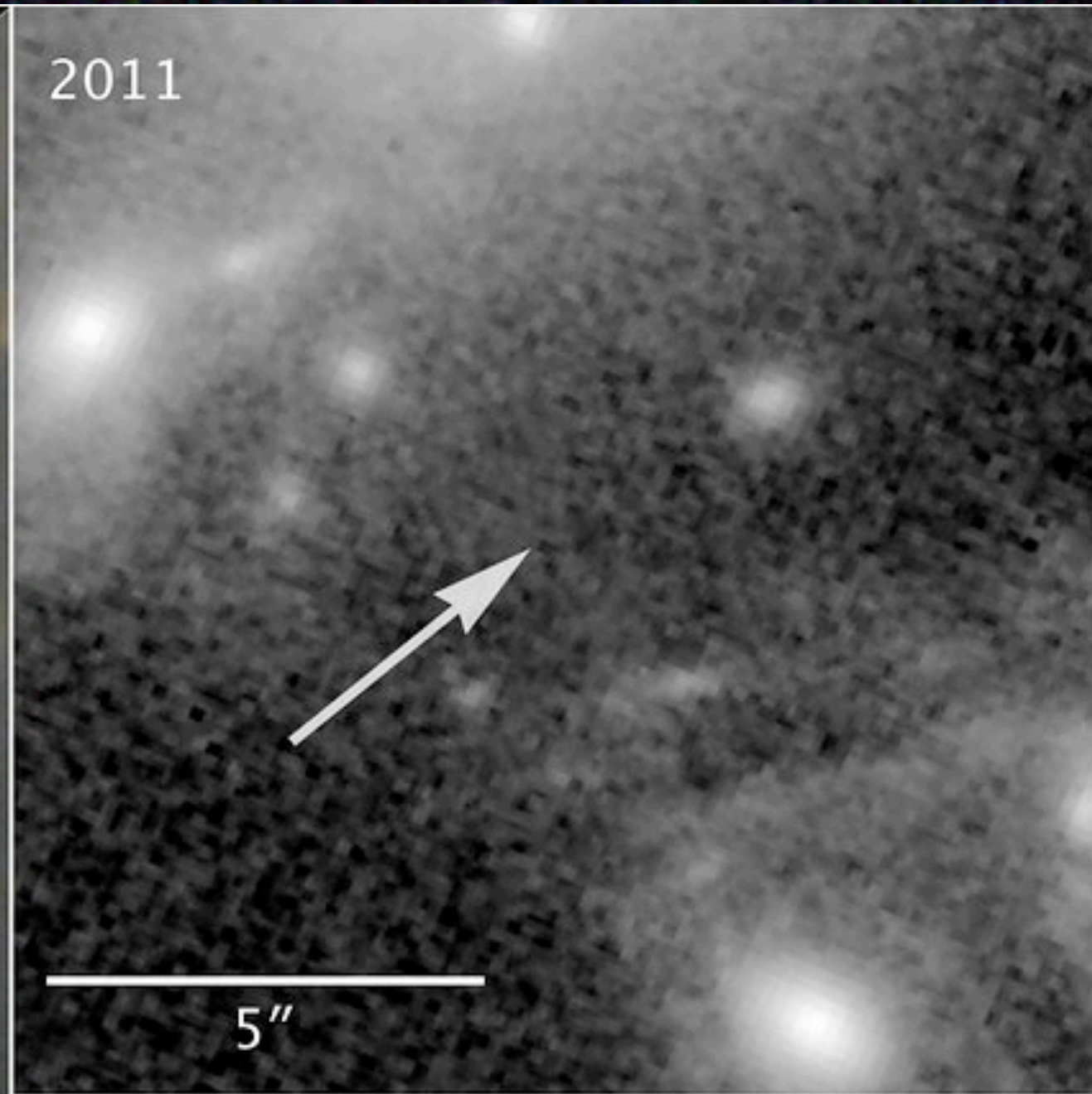
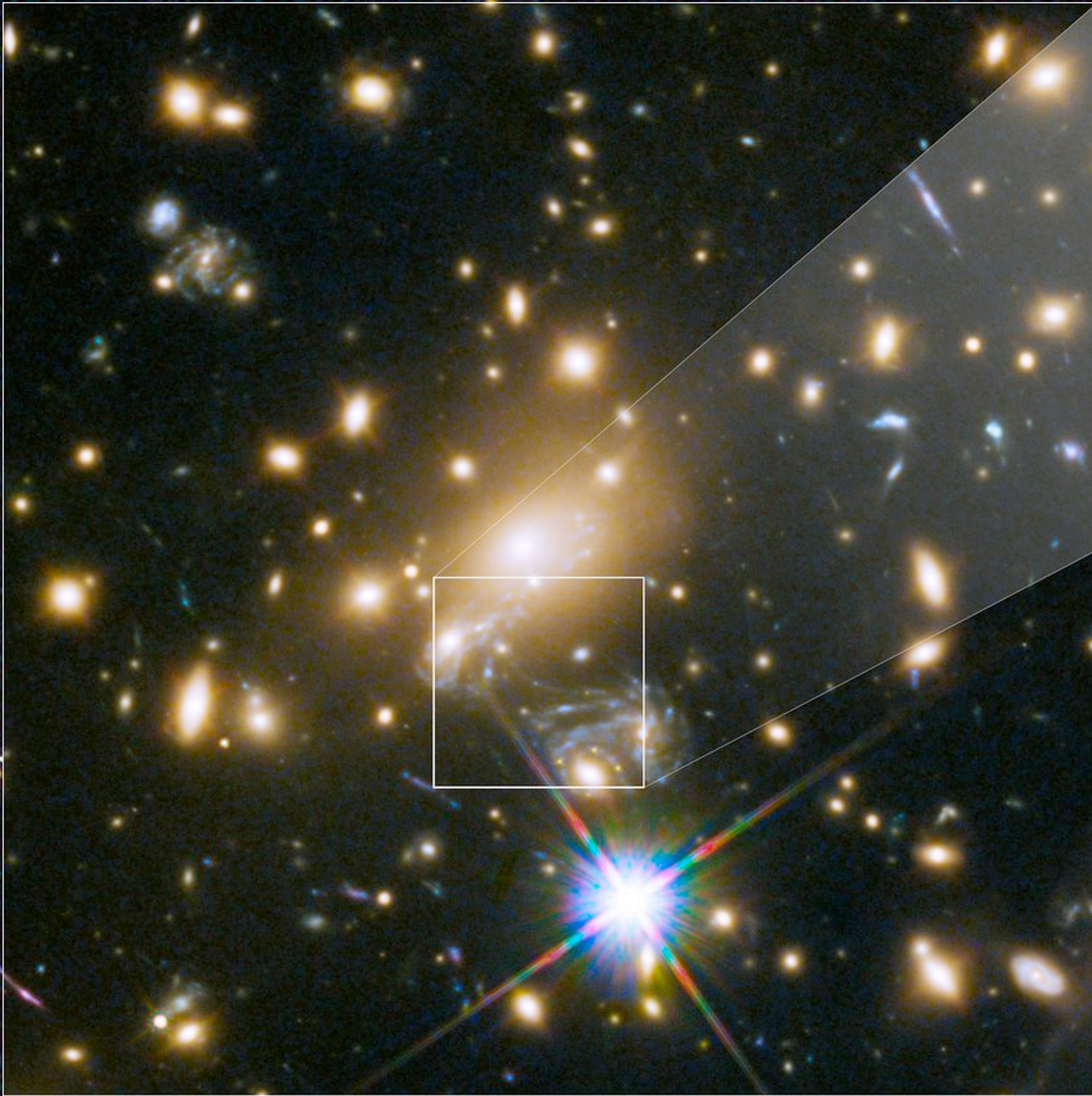
SL

Lensing galaxy

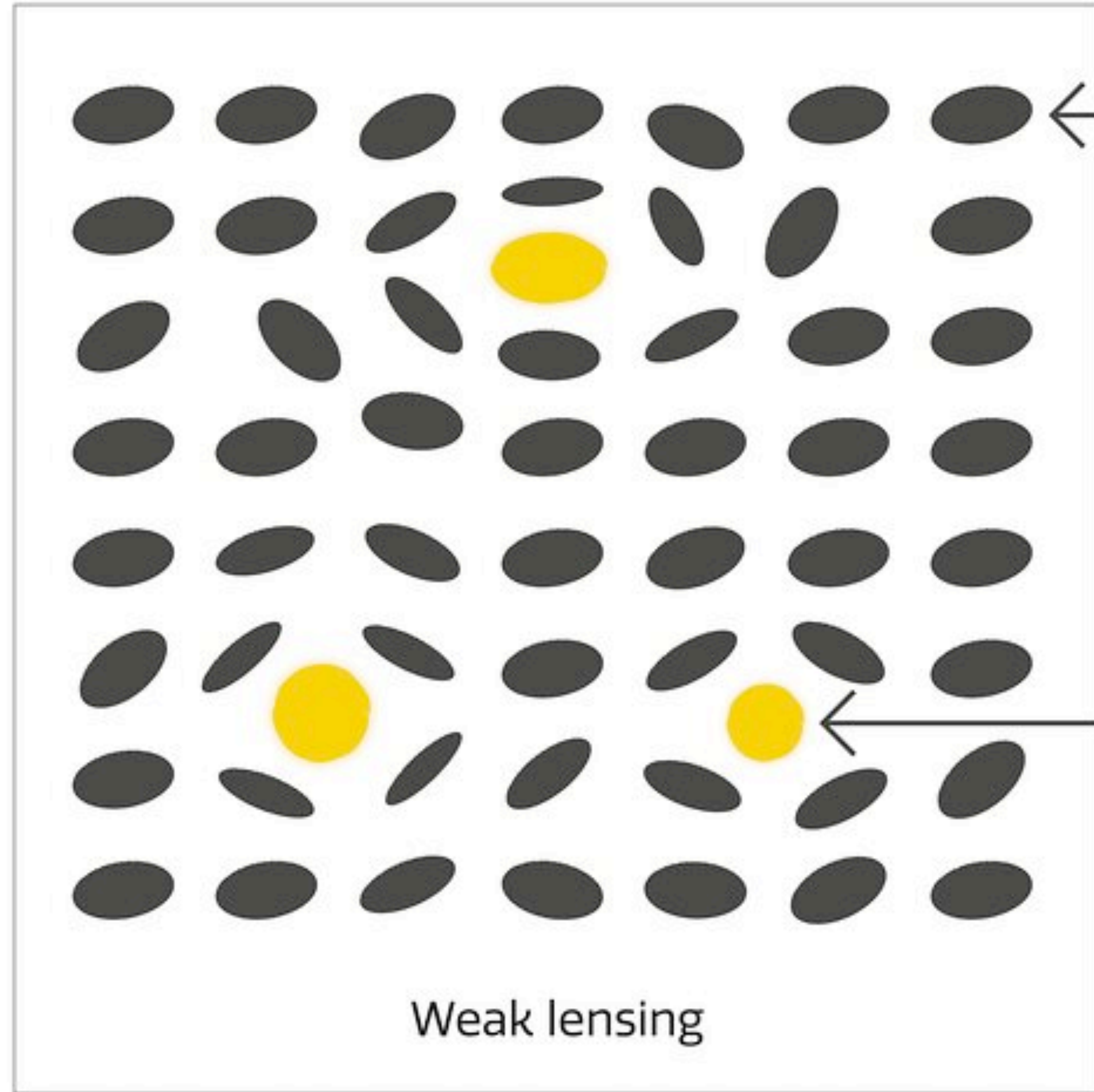
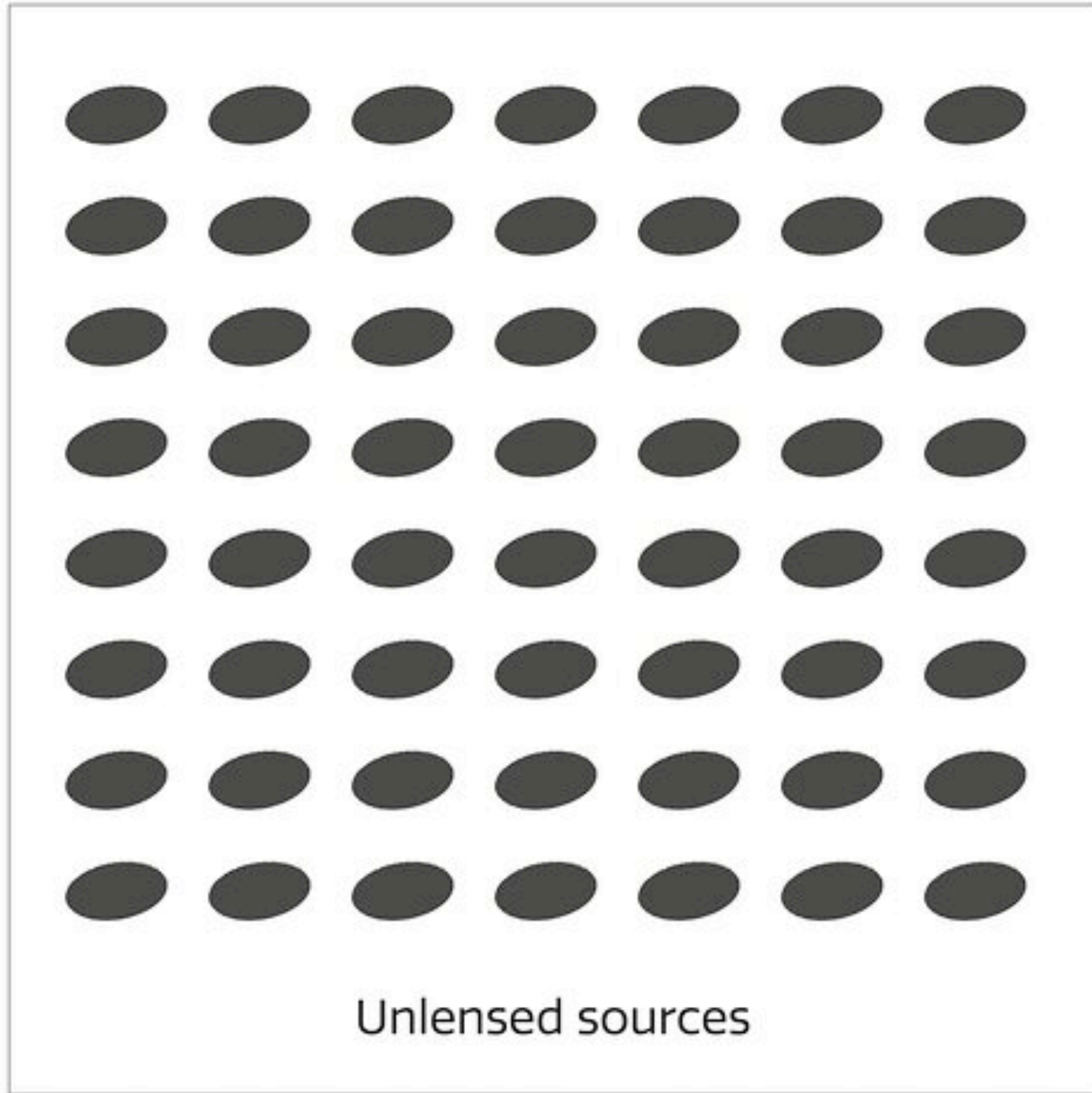


SL

Ler



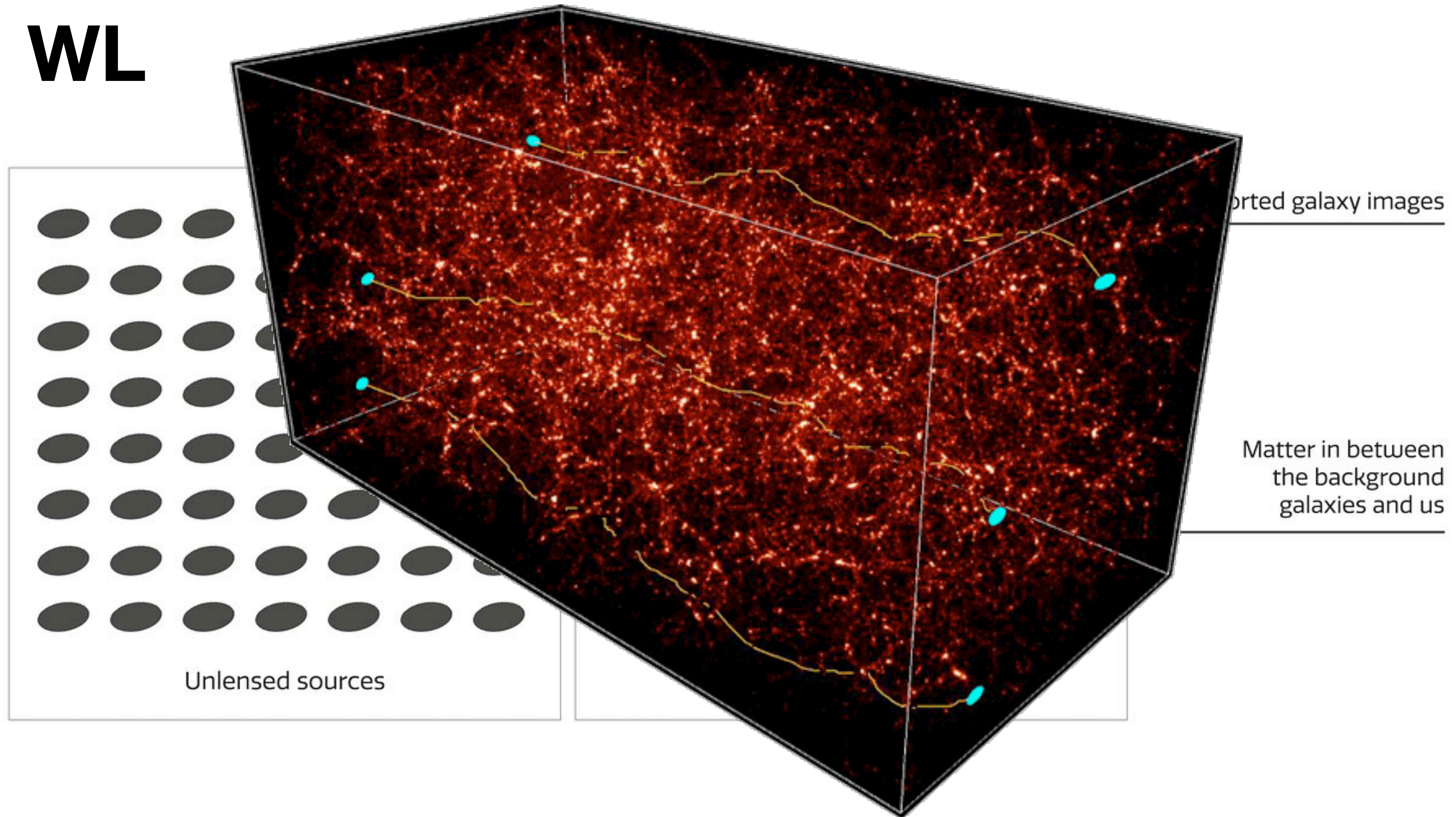
# WL



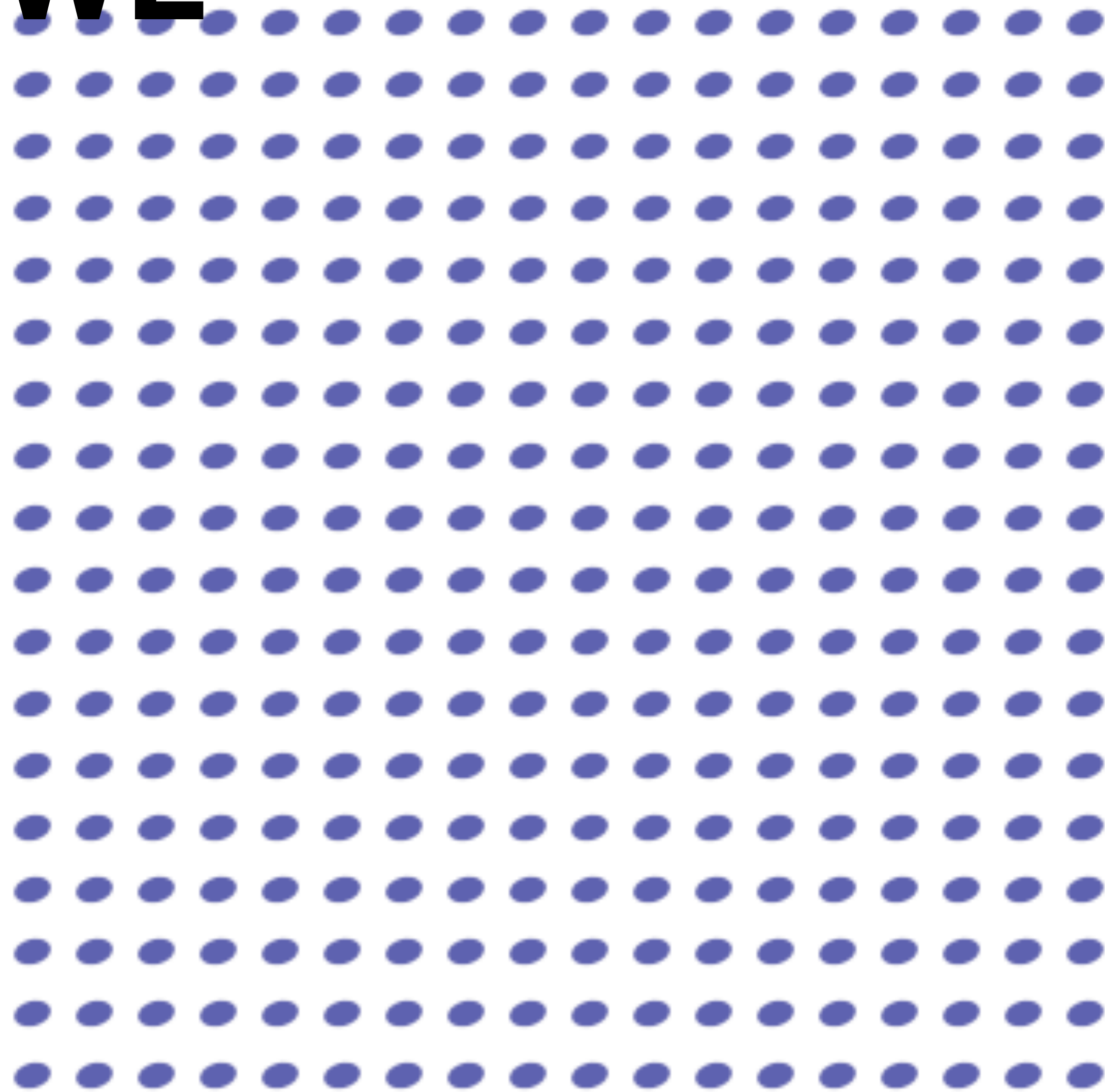
Distorted galaxy images

Matter in between  
the background  
galaxies and us

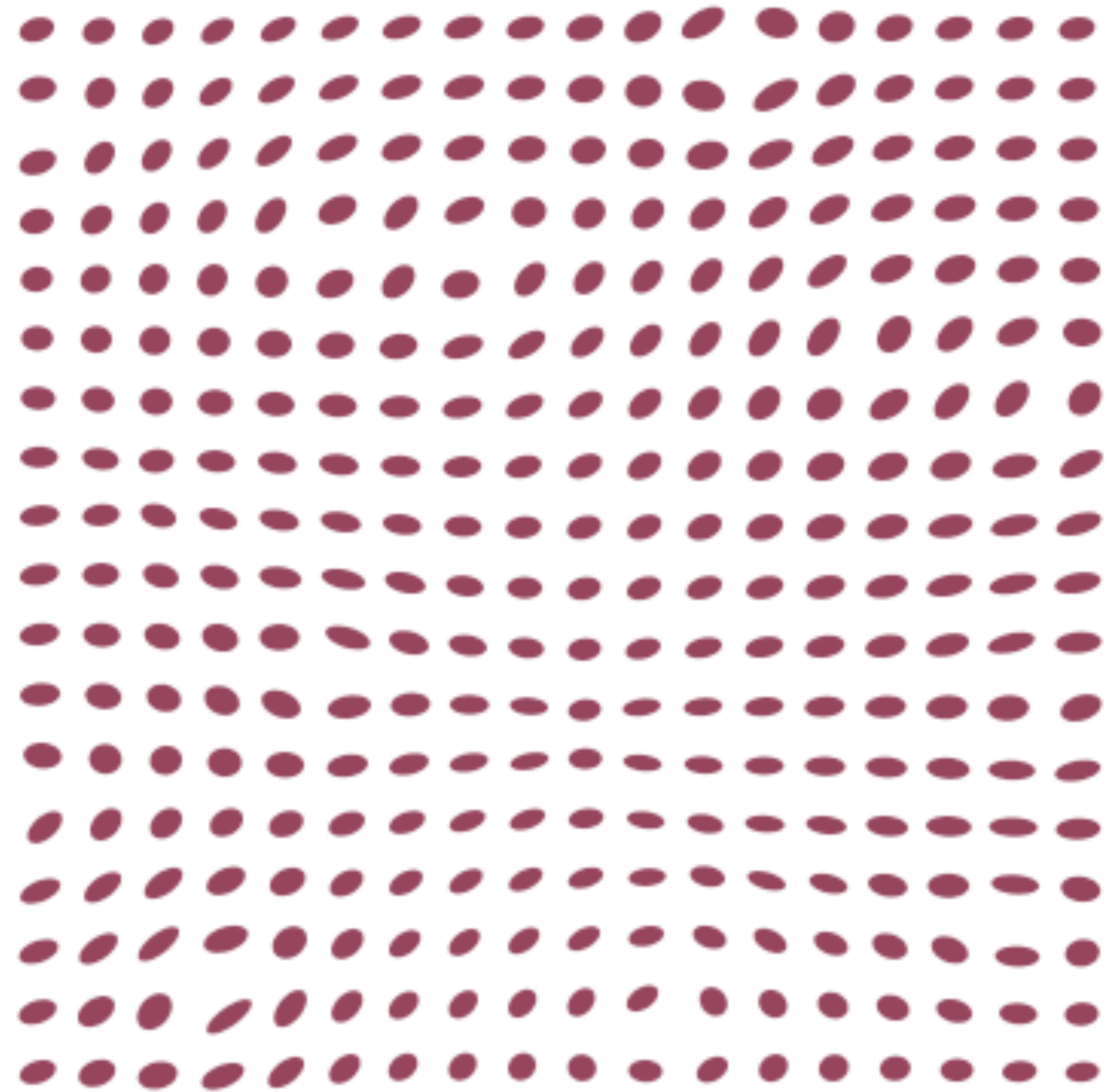
# WL



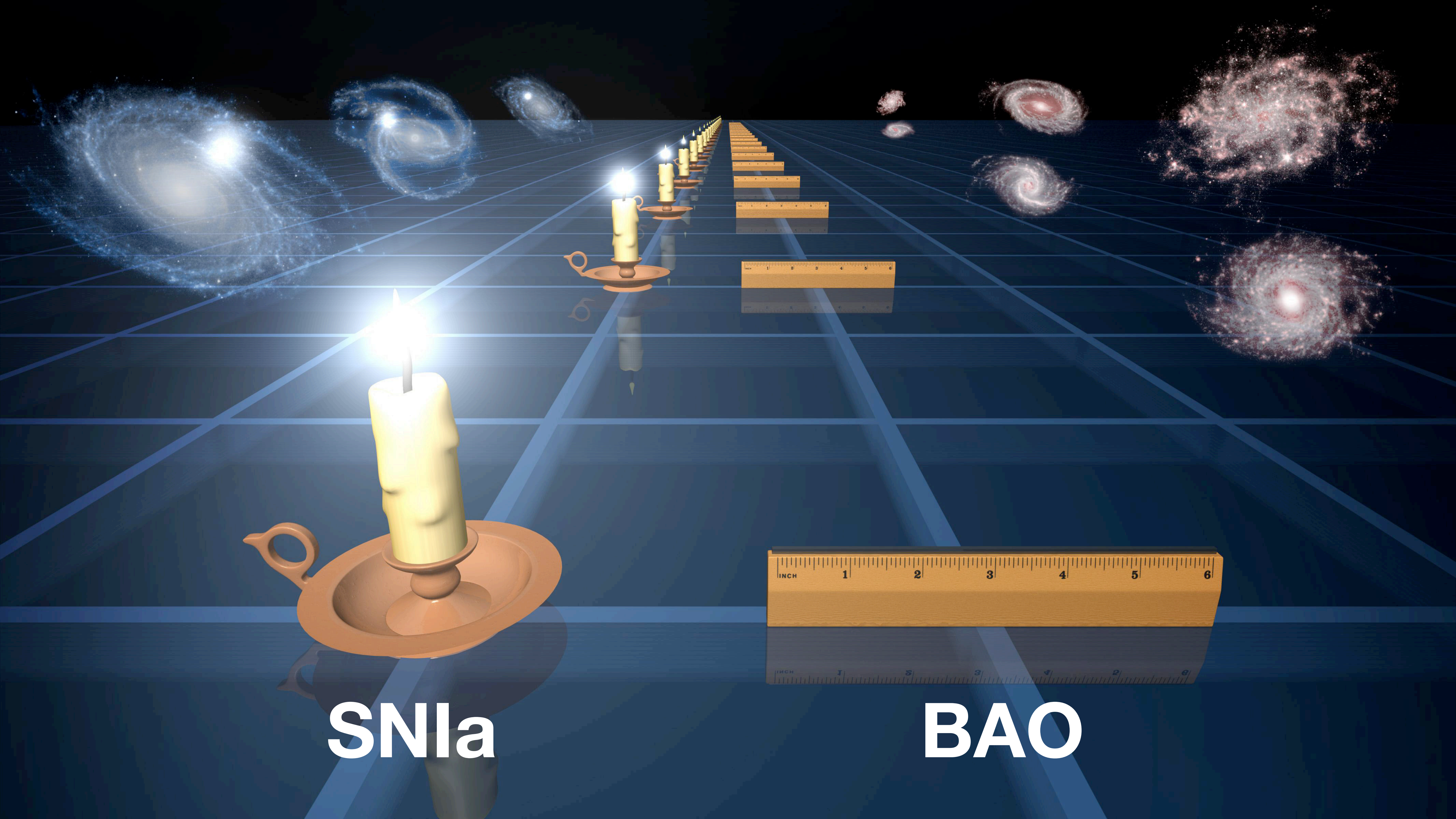
**WVL**



Unlensed sources



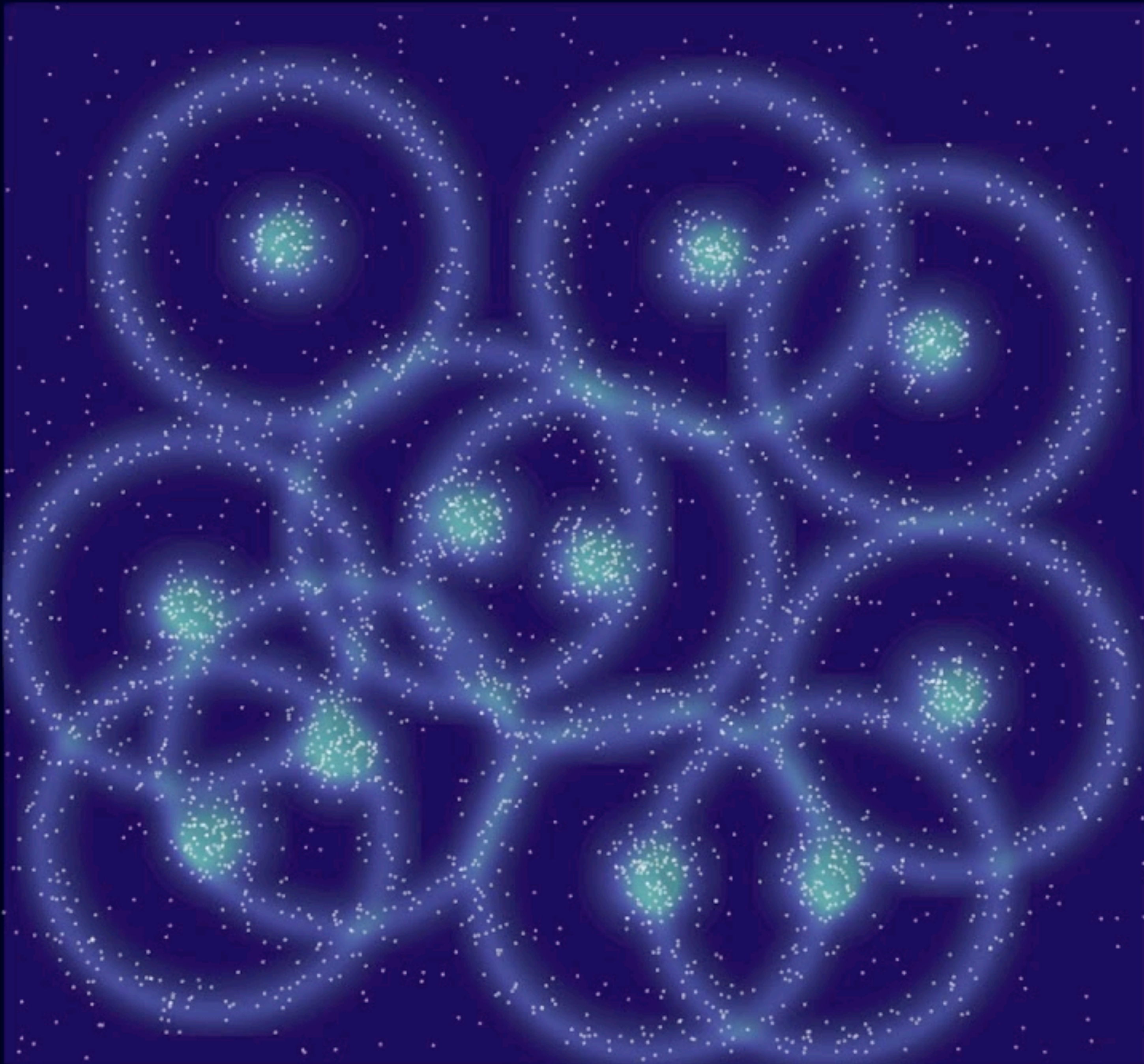
Weak lensing



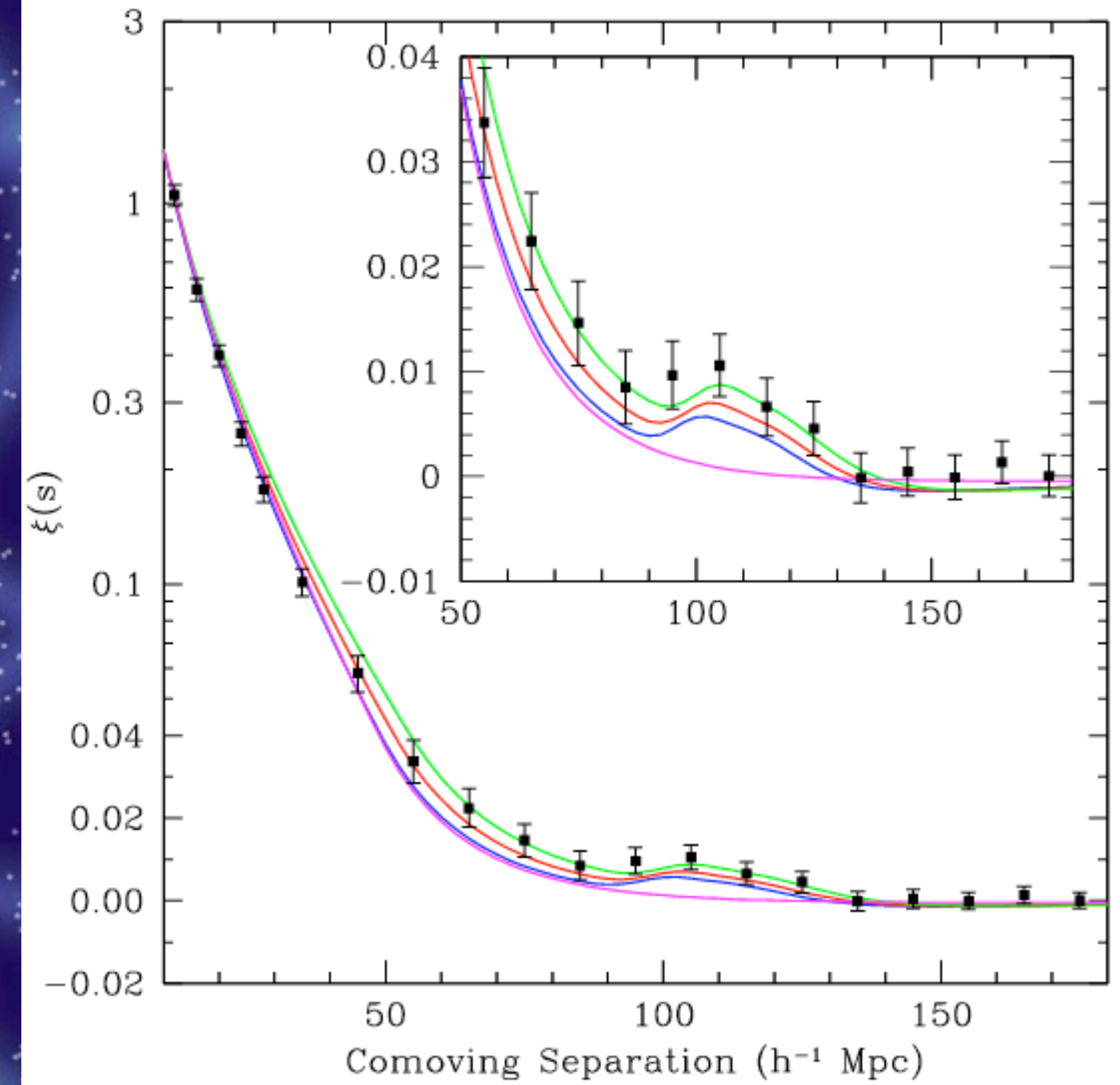
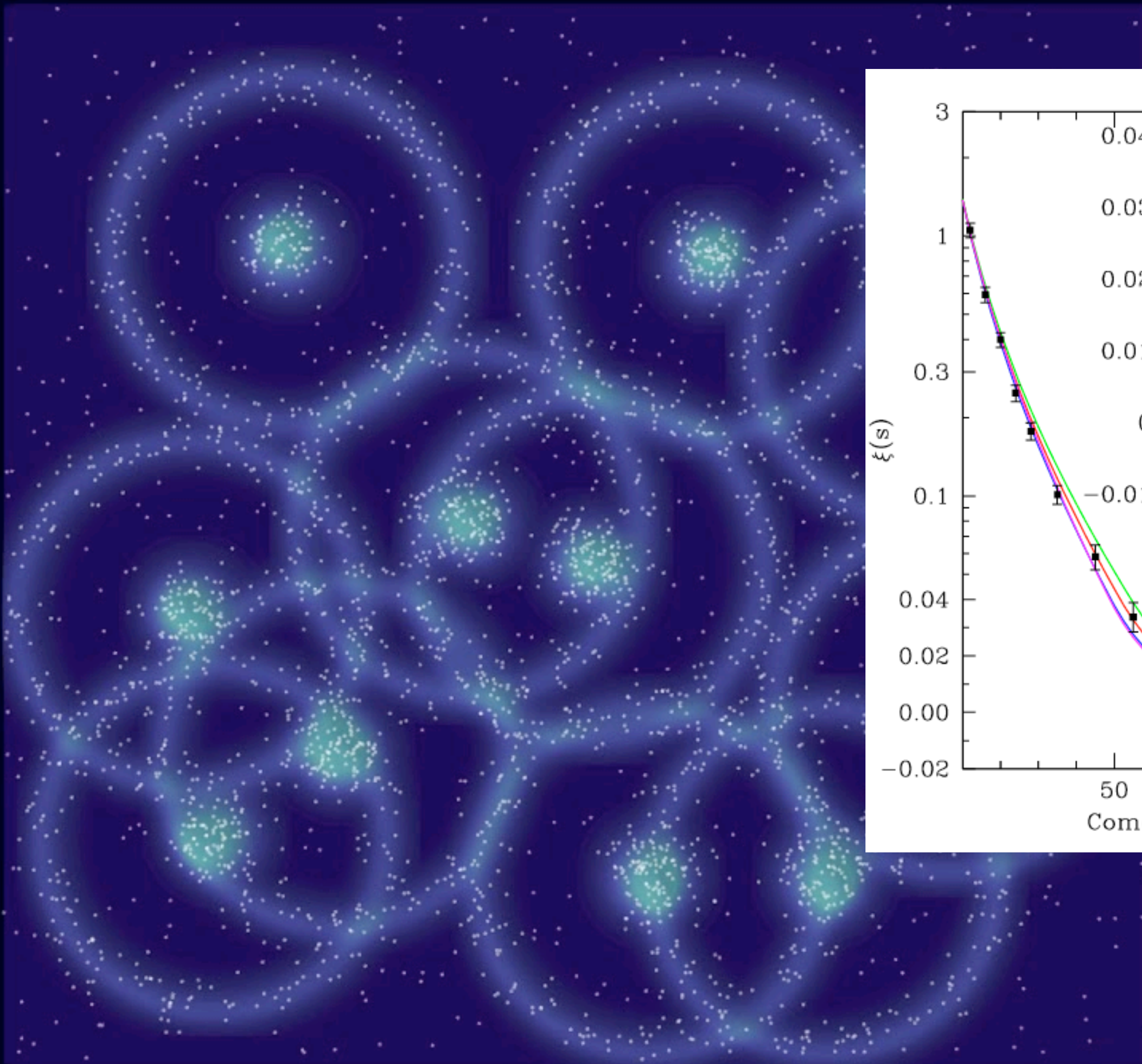
**SN Ia**

**BAO**

# BAO

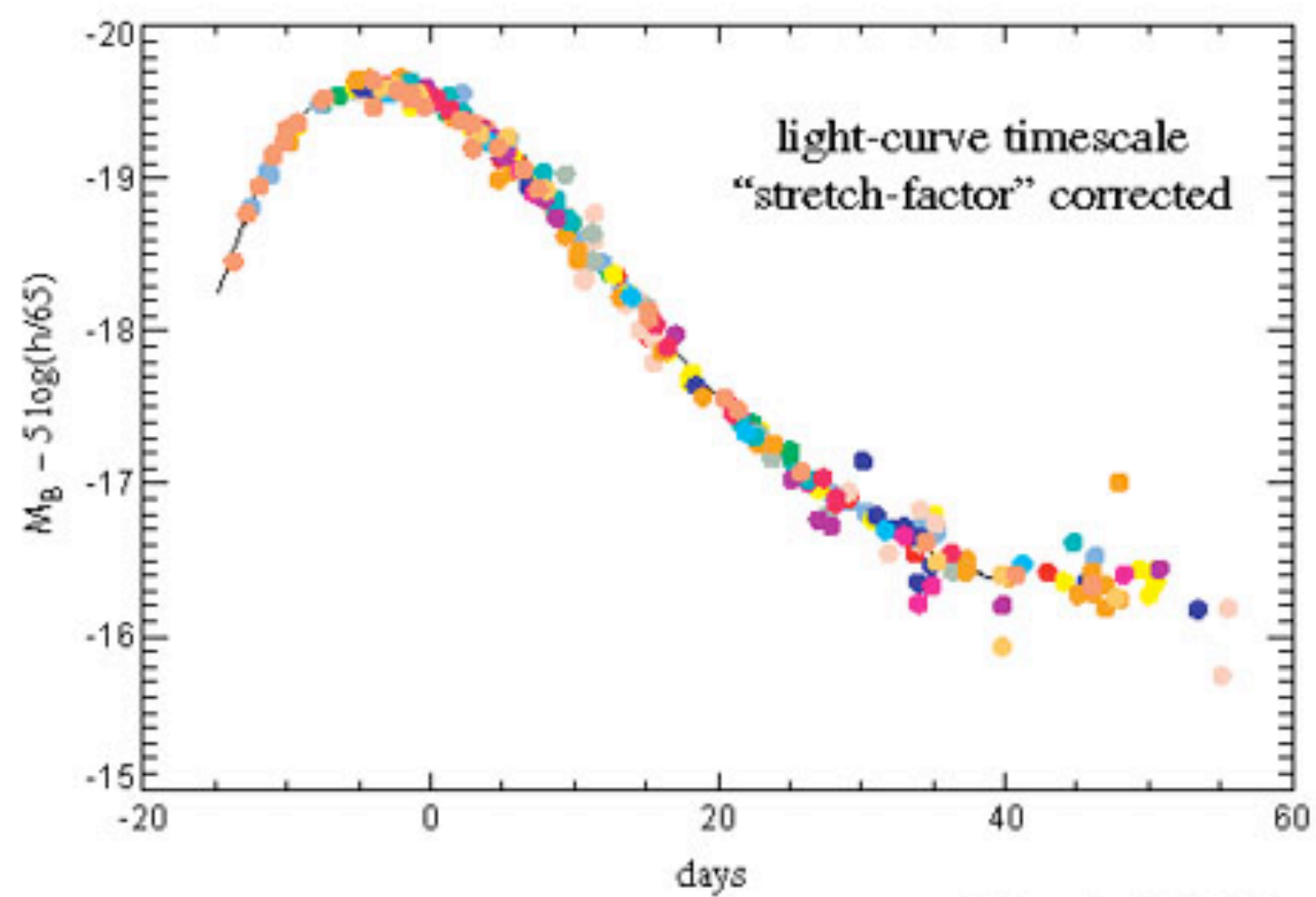
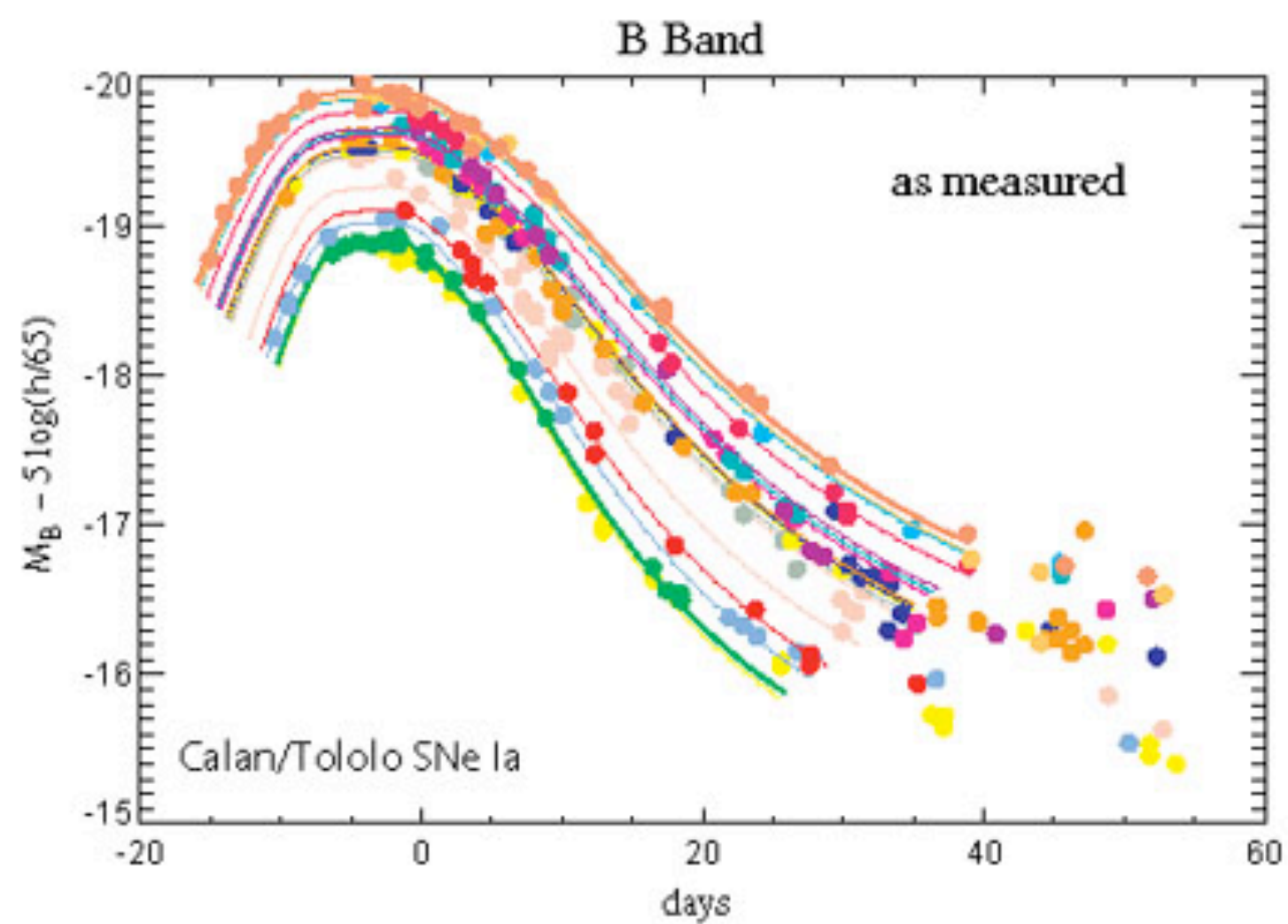


# BAO

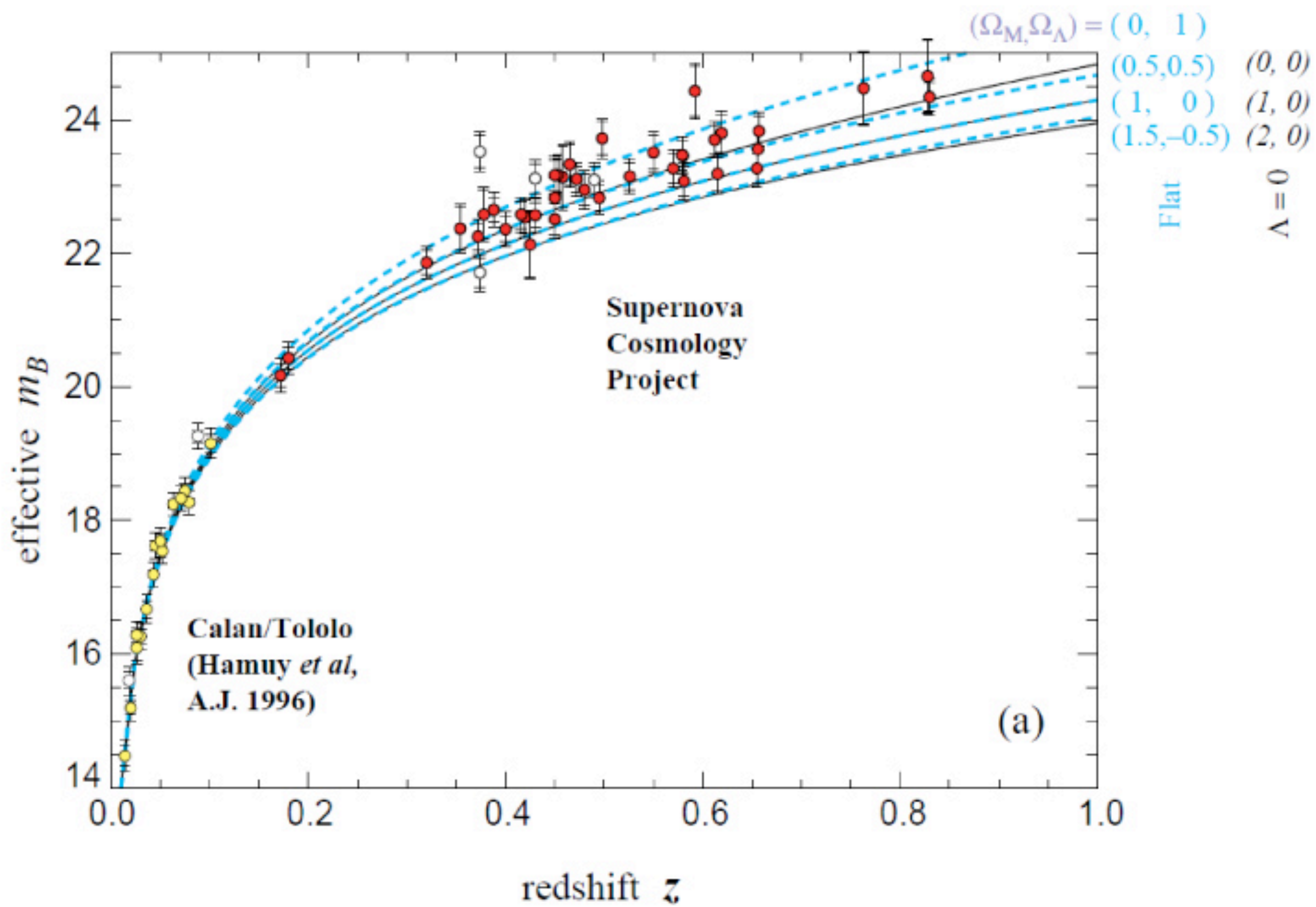




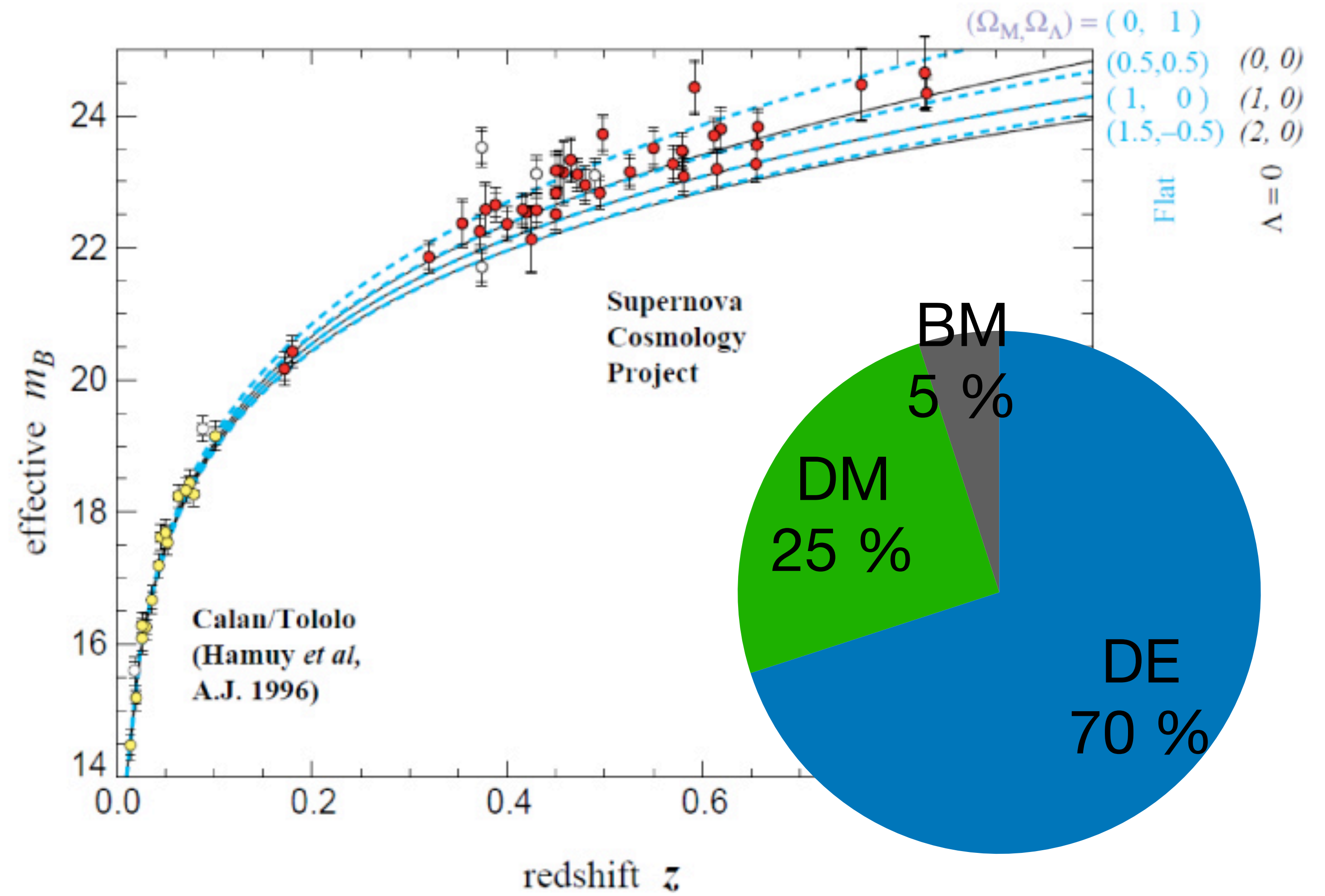
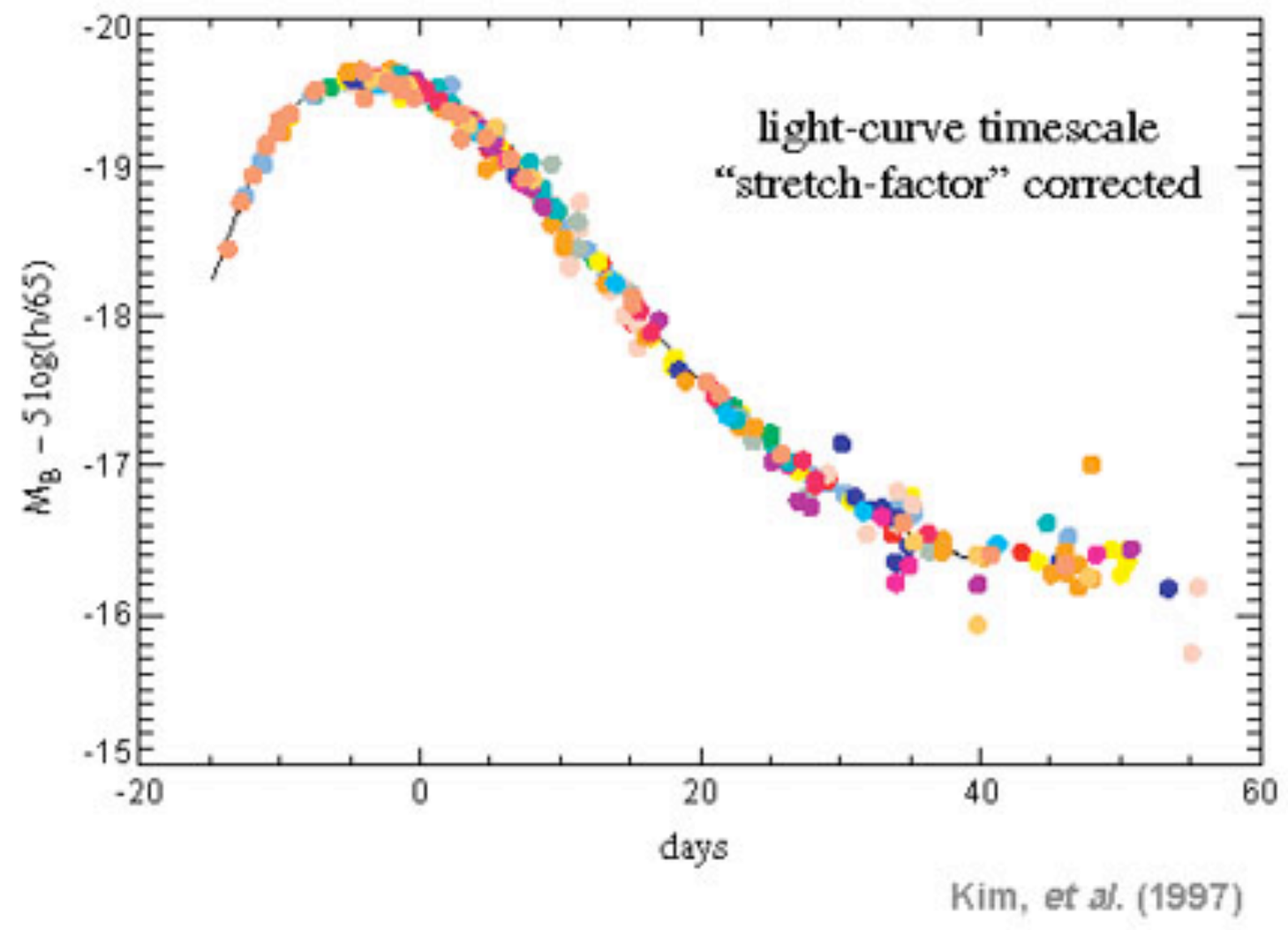
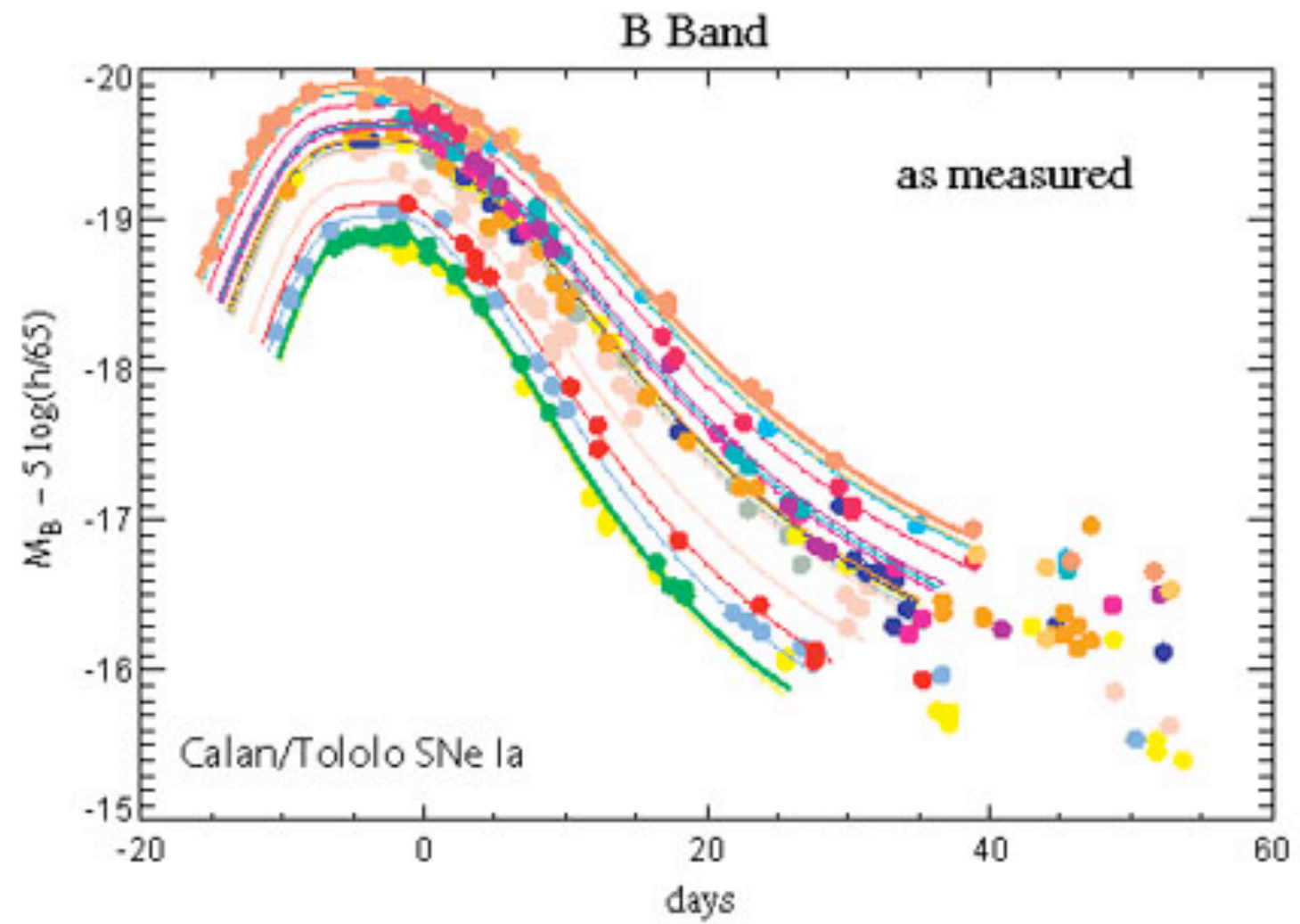
# SNIa



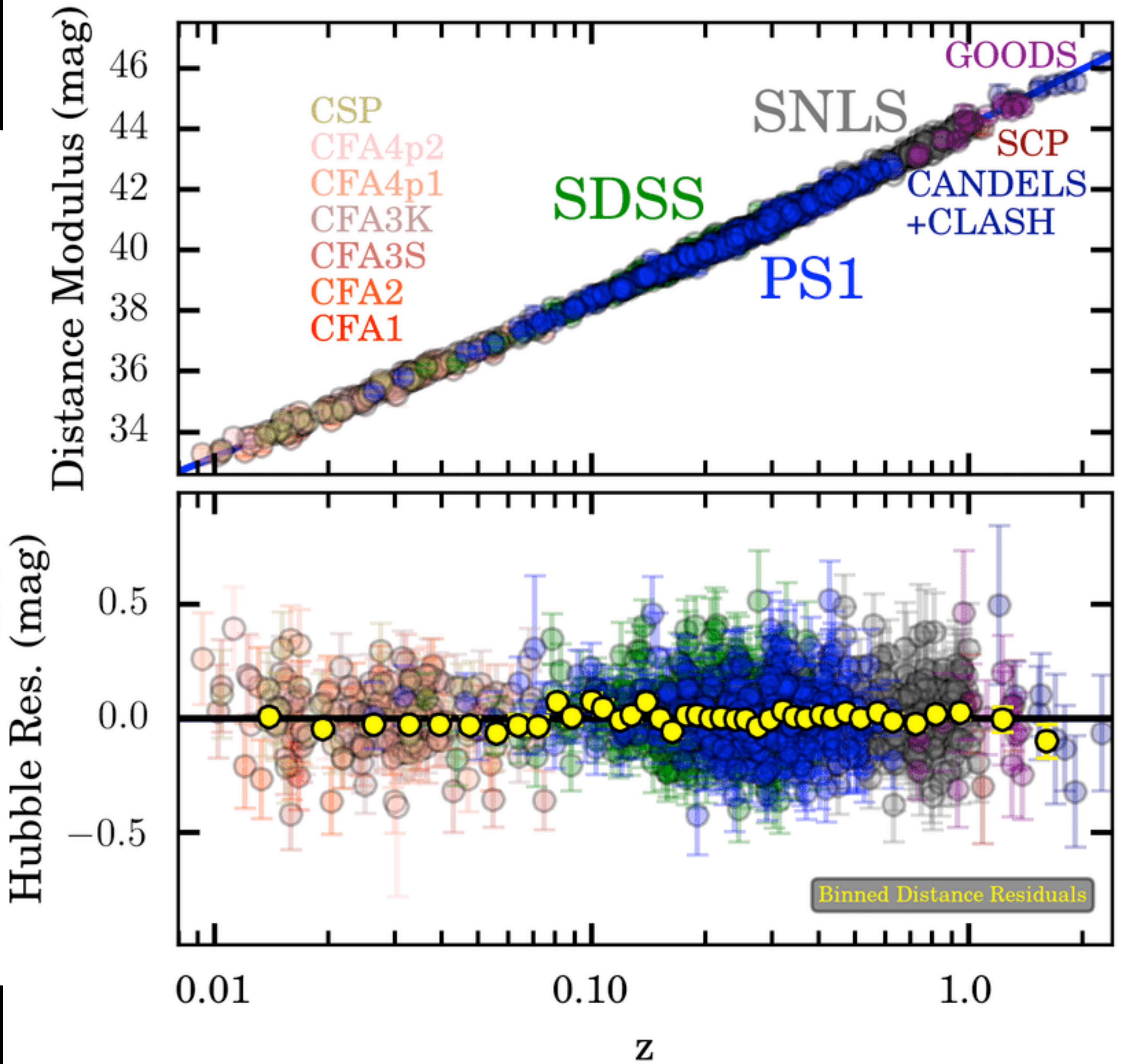
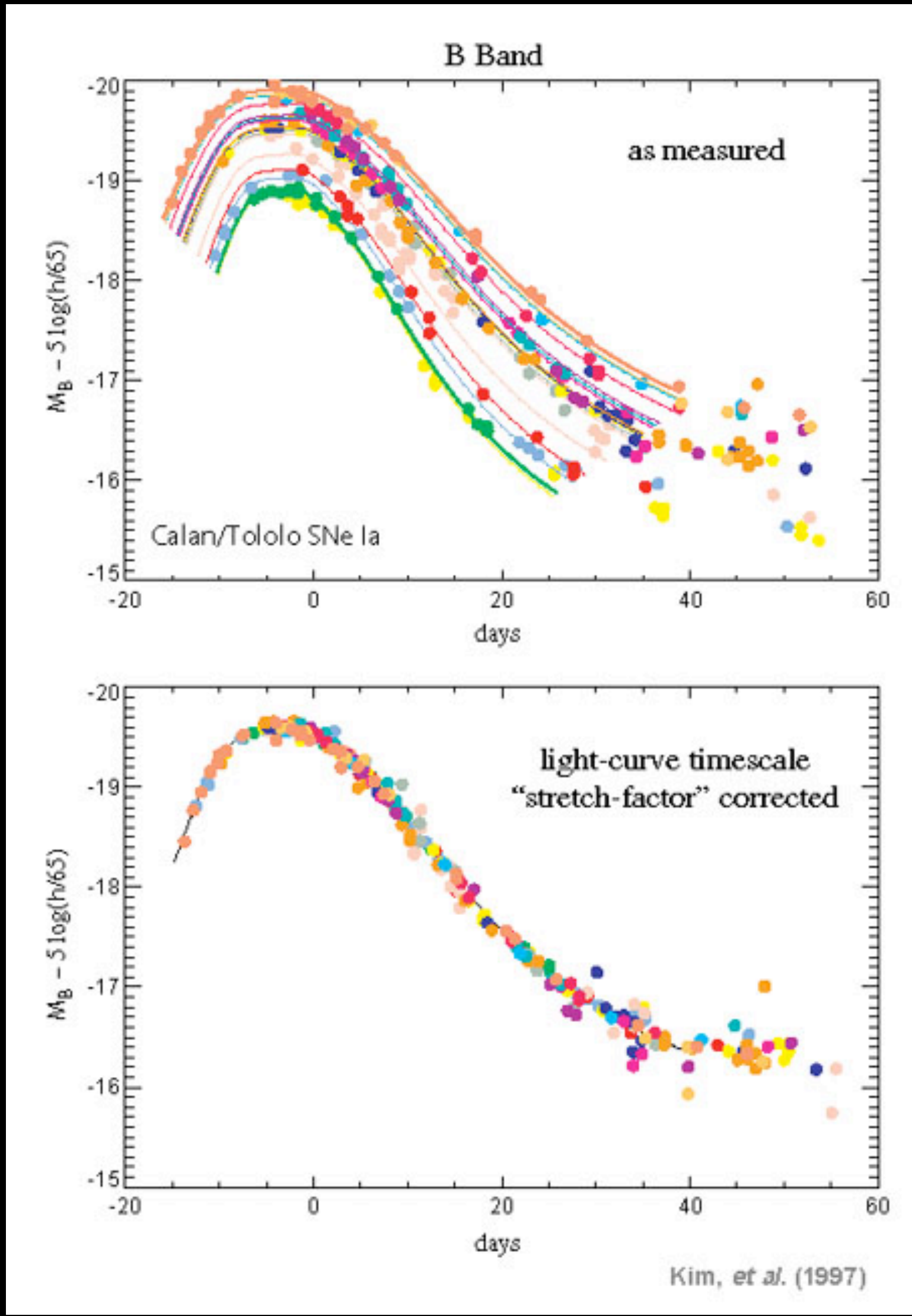
Kim, et al. (1997)



# SNIa



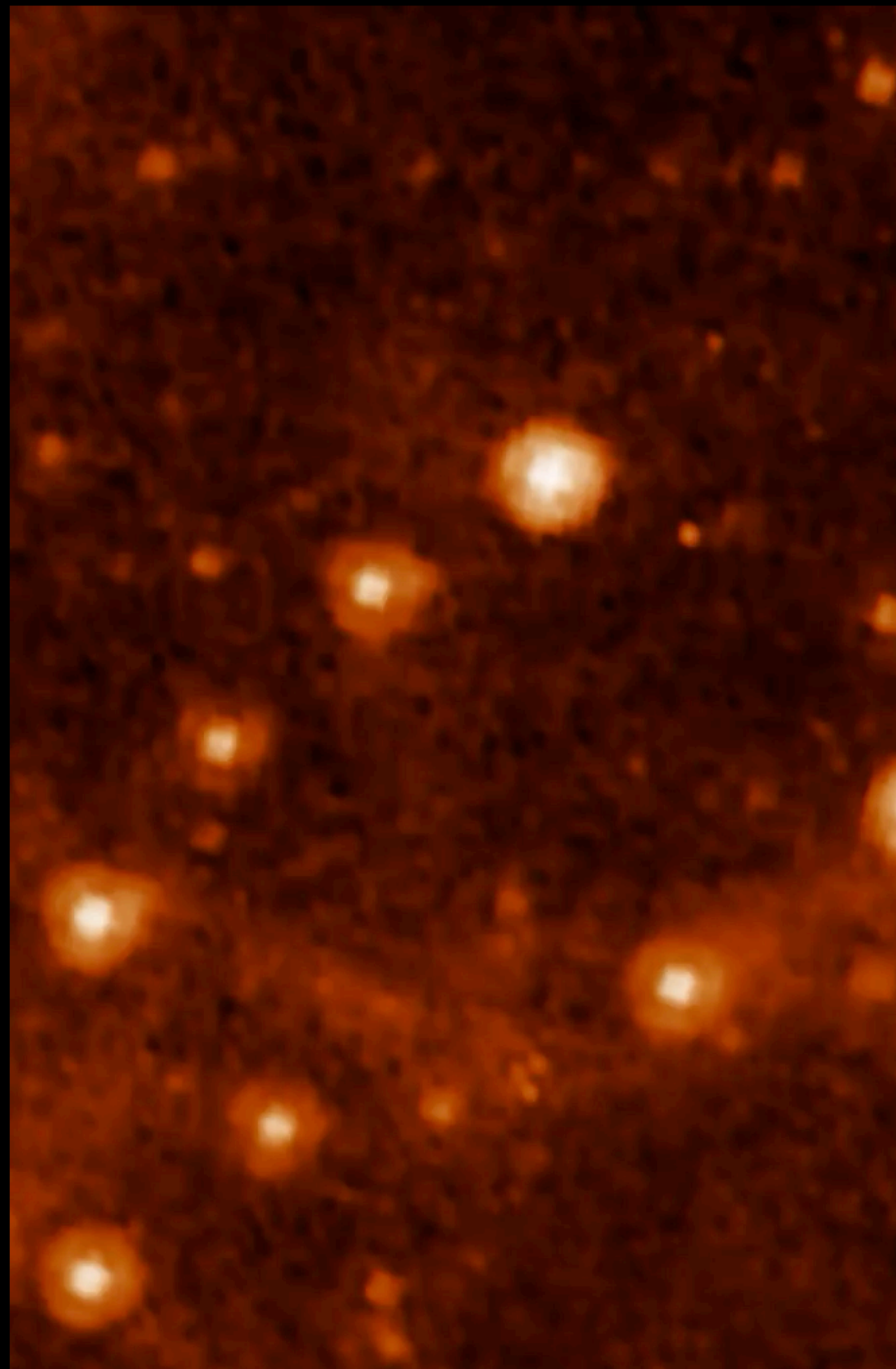
# SNIa



**gràcies**

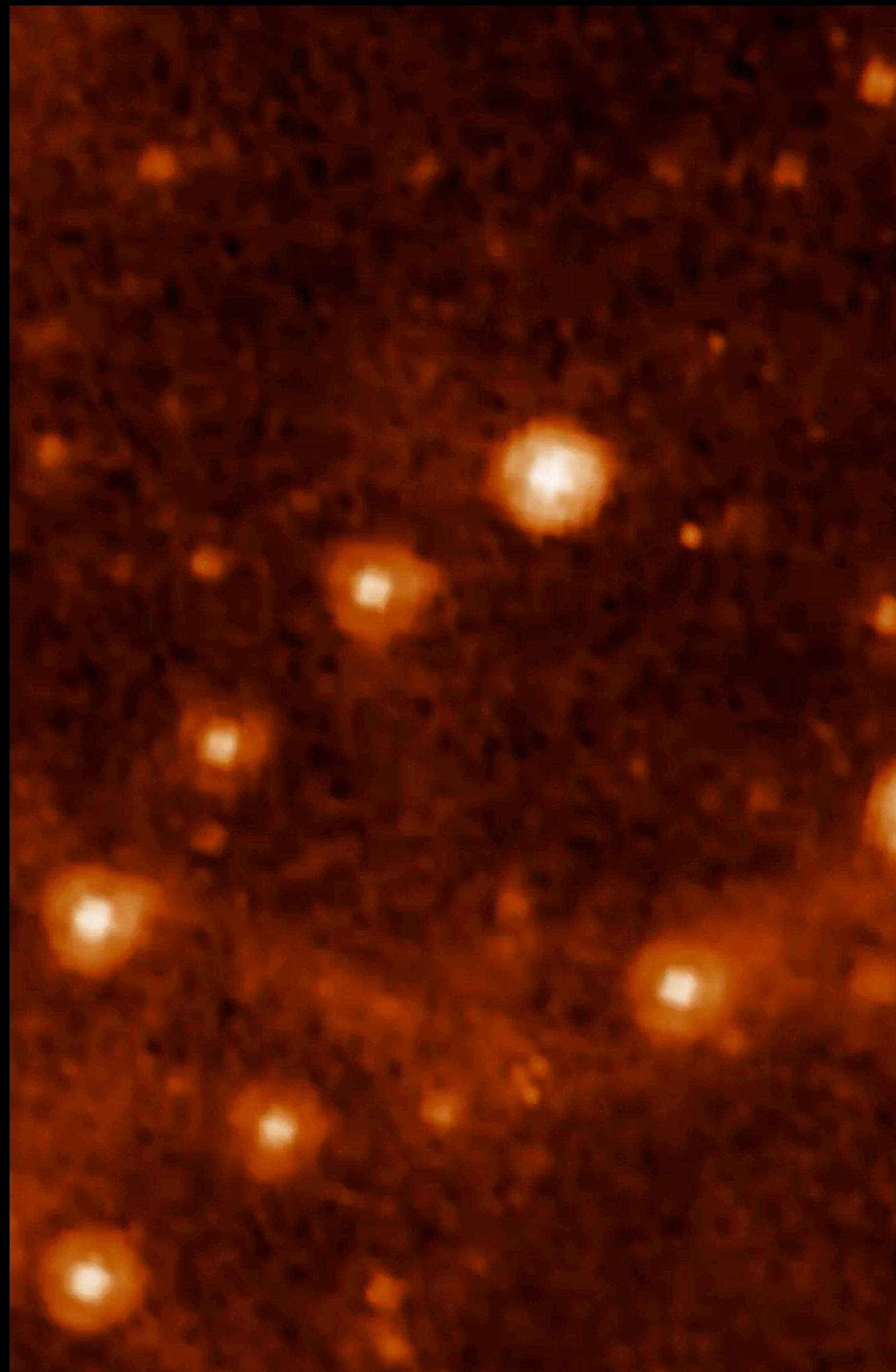
**(pausa per birra)**

I el que ve...



Spitzer 2003

I el que ve...



Spitzer 2003

Webb 2022

