



Istituto Nazionale di Astrofisica

Osservatorio astronomico di Brera



Universo in fiore

Luce sull'energia oscura: Euclid e la cosmologia dallo spazio

Luigi Guzzo

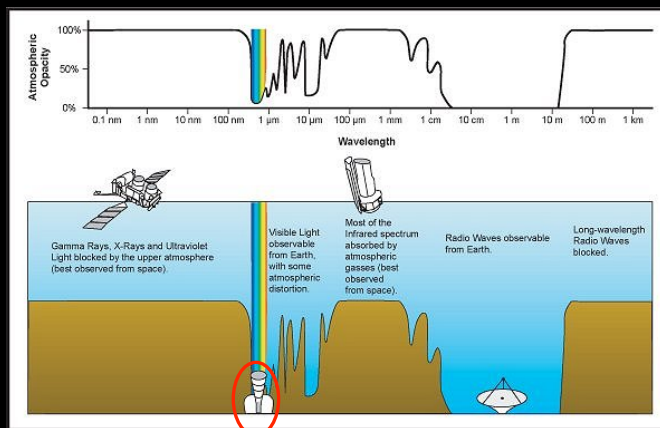
Luigi.guzzo@brera.inaf.it

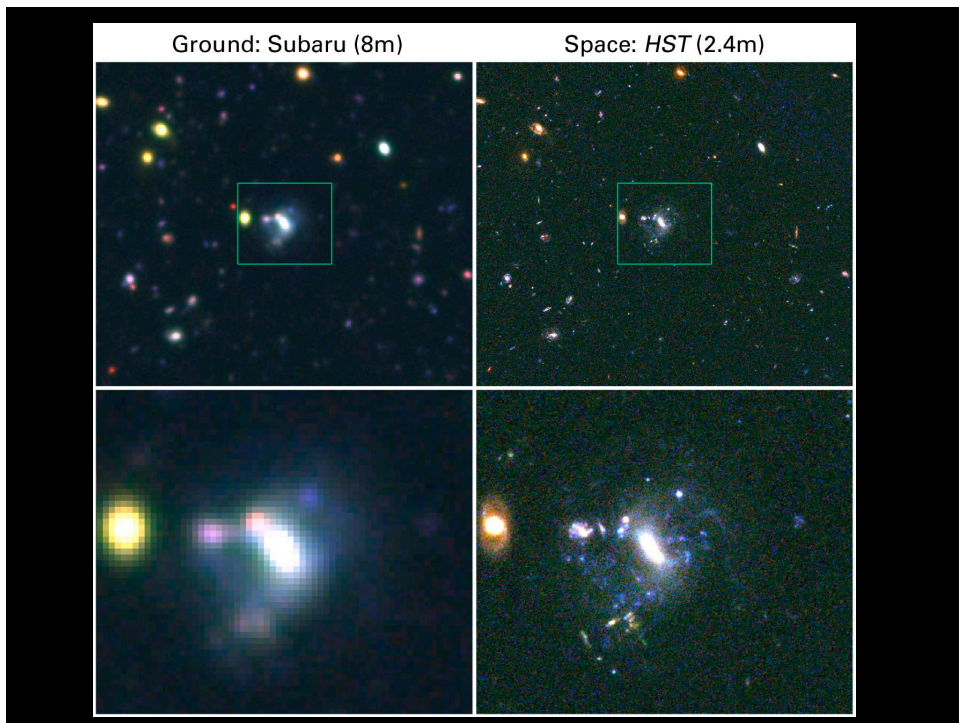
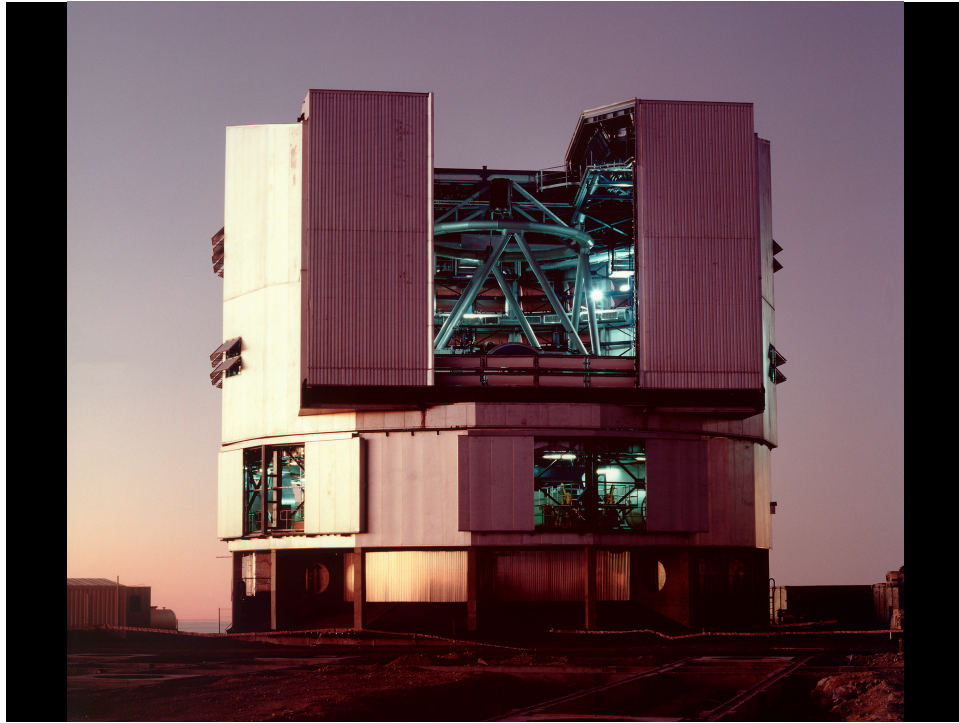
INAF-Osservatorio Astronomico di Brera



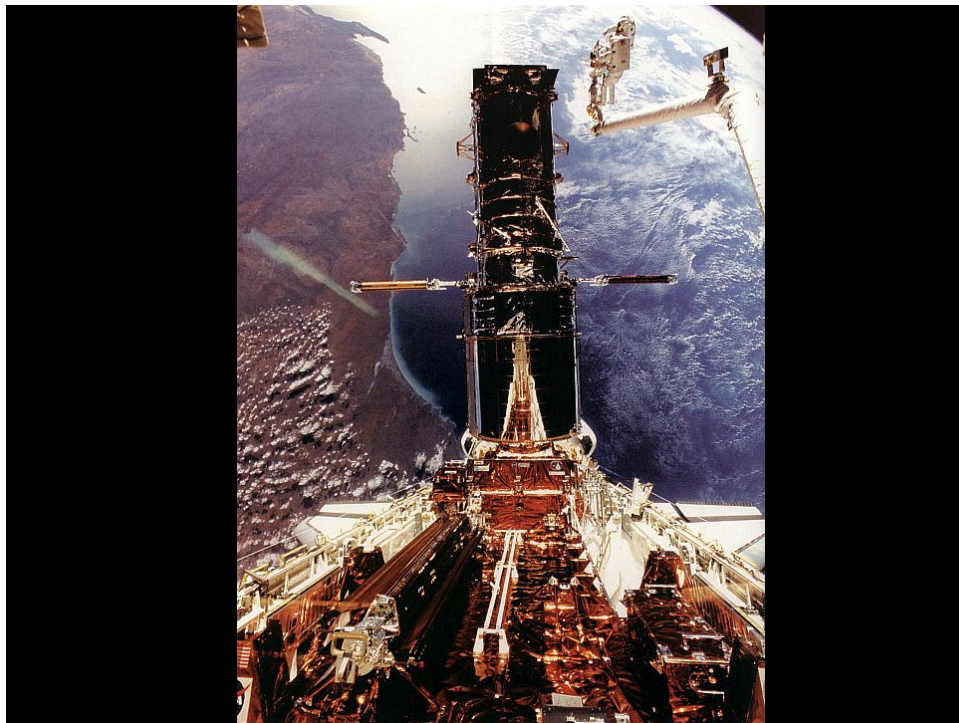
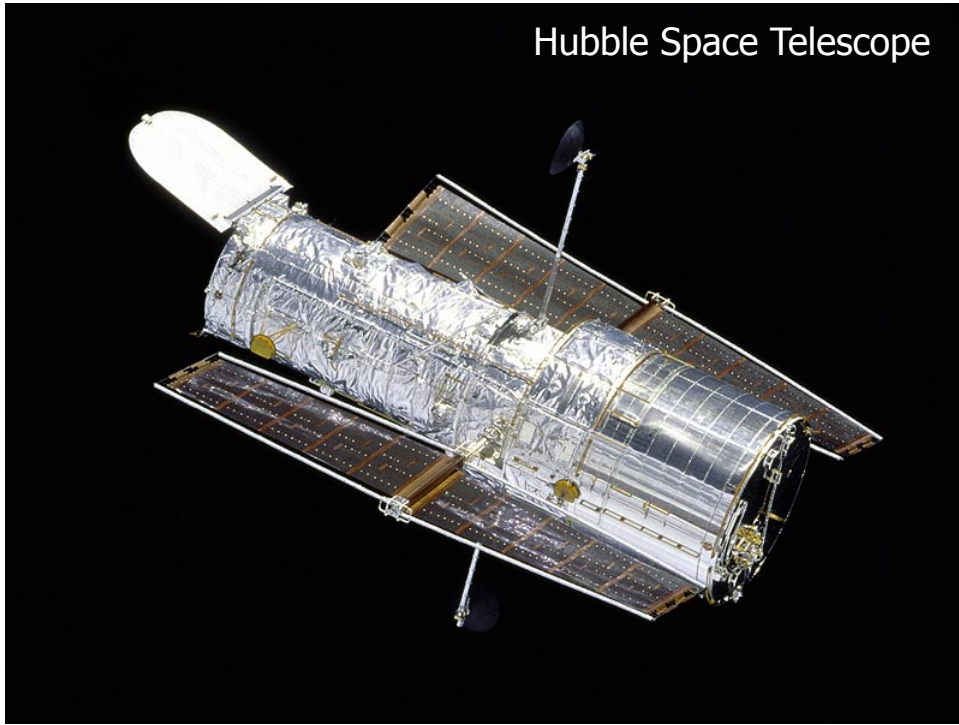


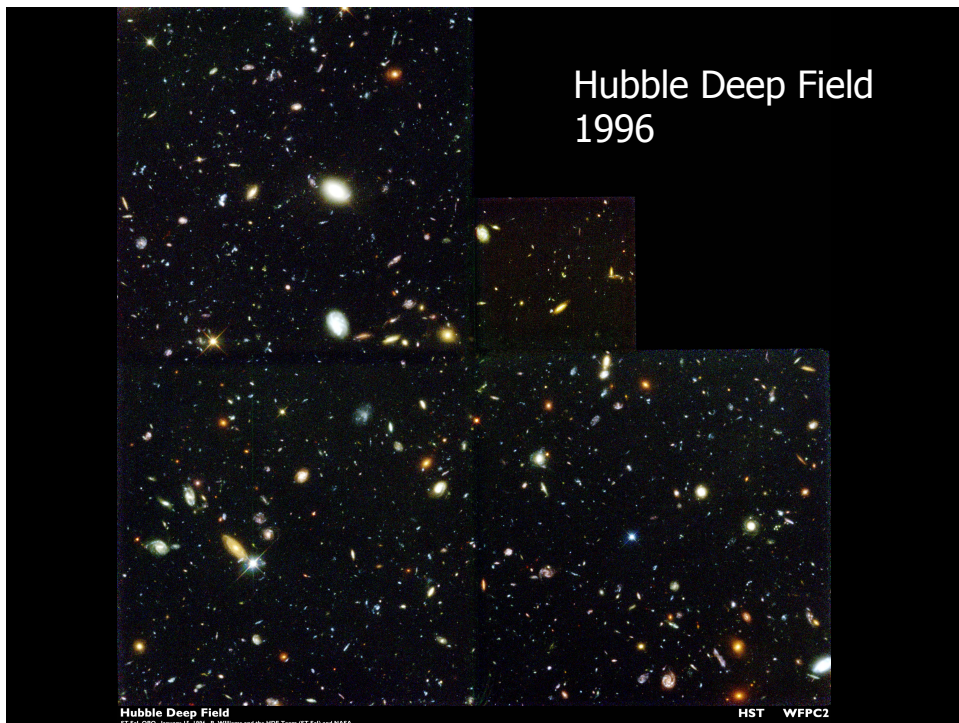
La nostra finestra sull'Universo e' molto stretta

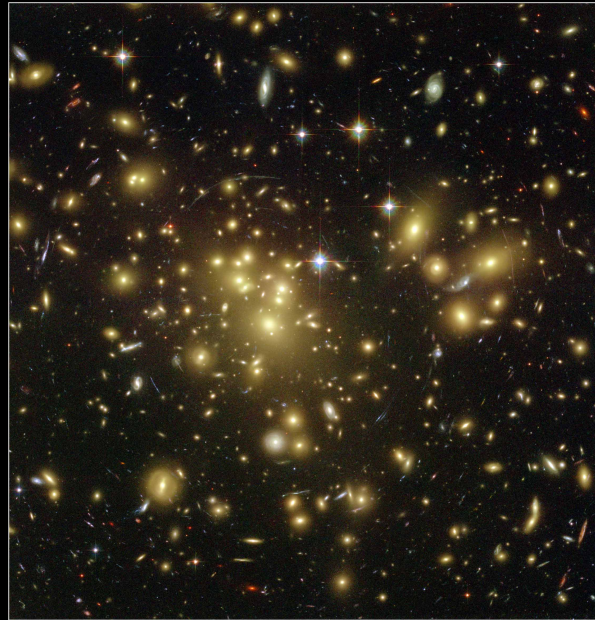




Hubble Space Telescope

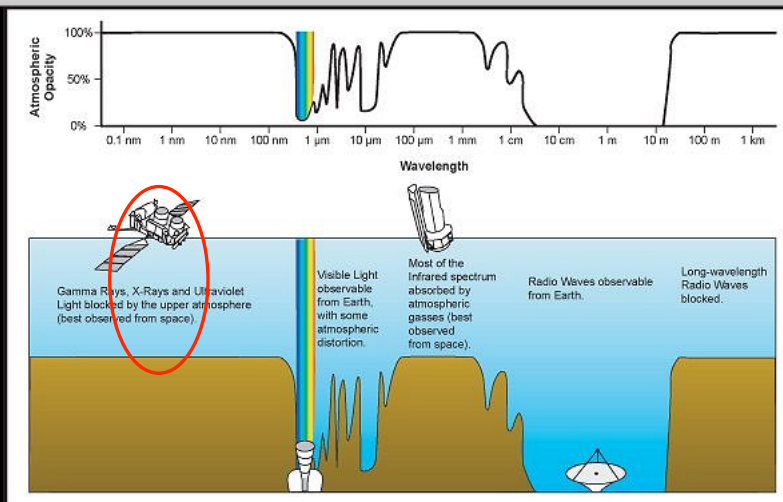


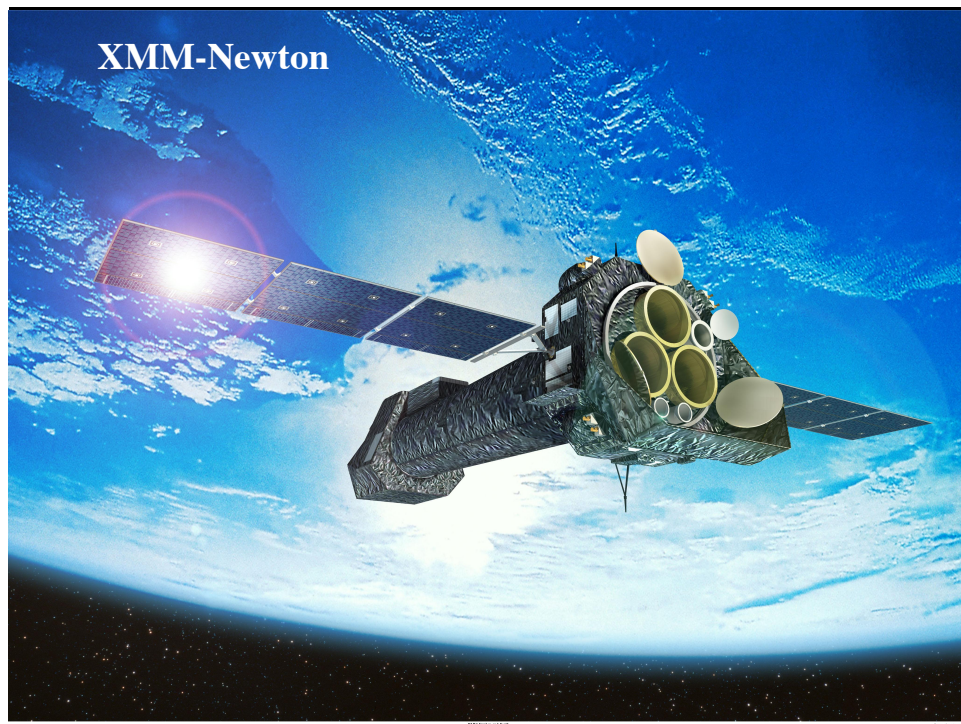




Galaxy Cluster Abell 1689
Hubble Space Telescope • Advanced Camera for Surveys

La banda X (10^{-10} m, 1-20 KeV)

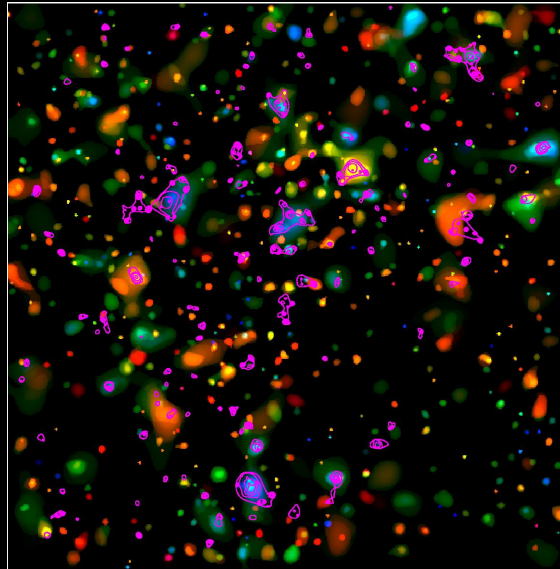




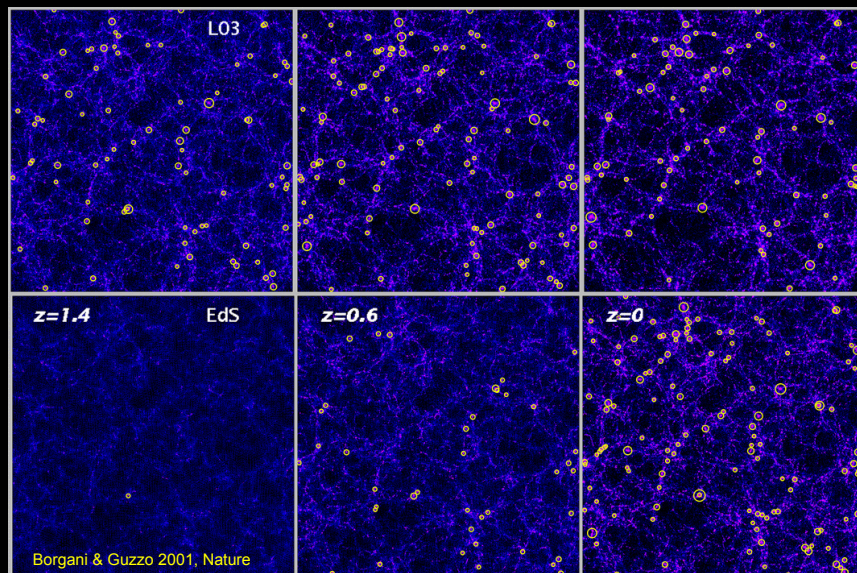
Gli ammassi di galassie contengono un gas diffuso a temperature di $\sim 10\text{-}100$ milioni di gradi, che emette nei raggi X



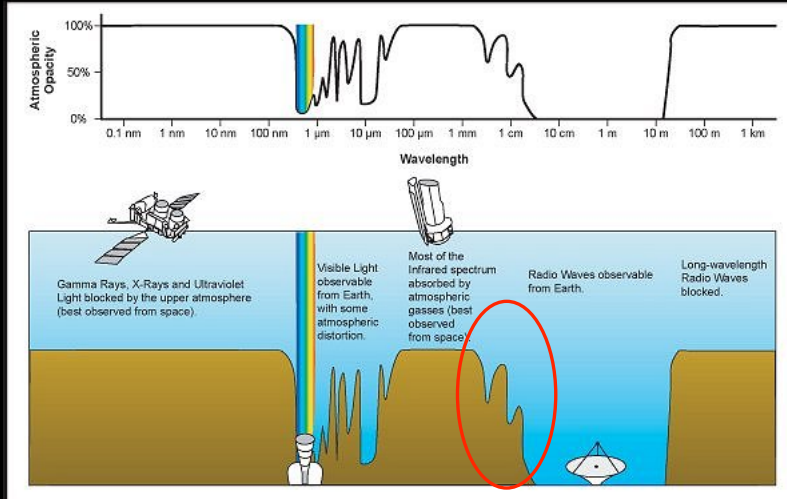
COSMOS-XMM Survey



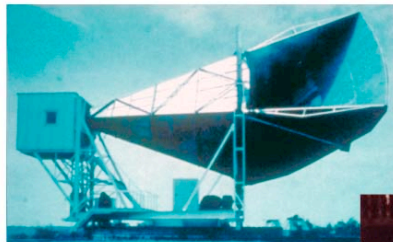
La densita' in numero degli ammassi dipende dalla cosmologia



La banda radio (microonde, ~1 cm)



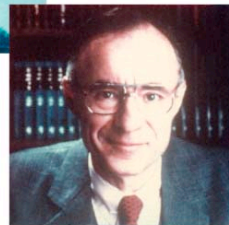
DISCOVERY OF COSMIC BACKGROUND



Microwave Receiver



Robert Wilson

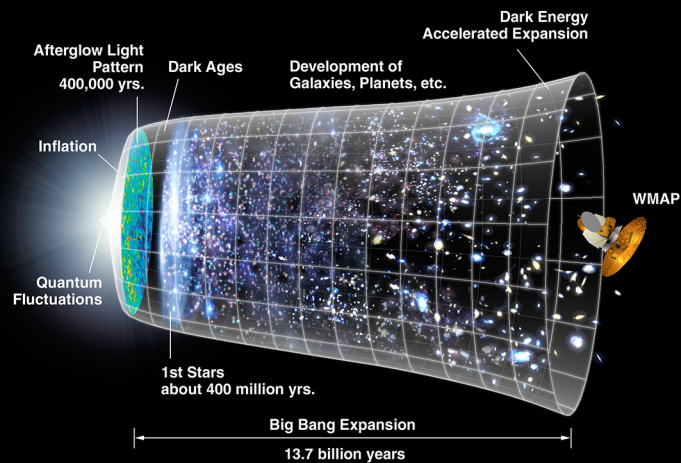
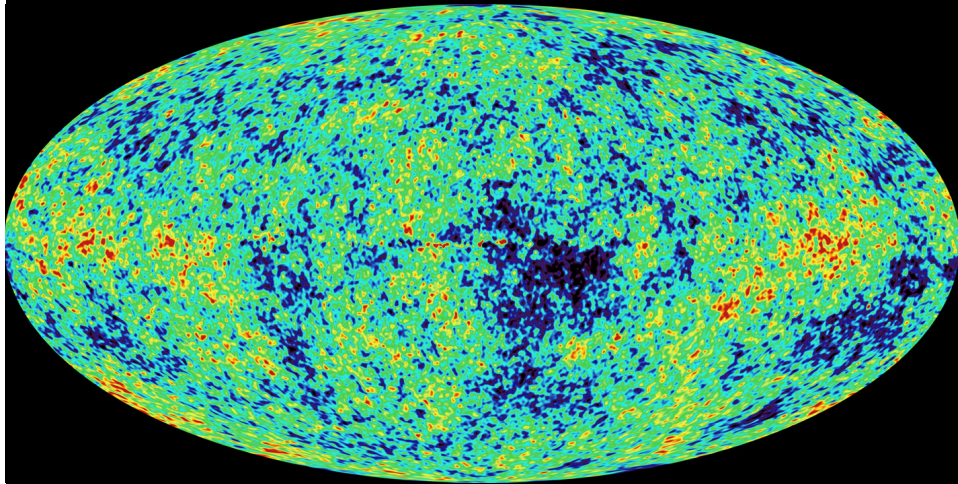


Arno Penzias

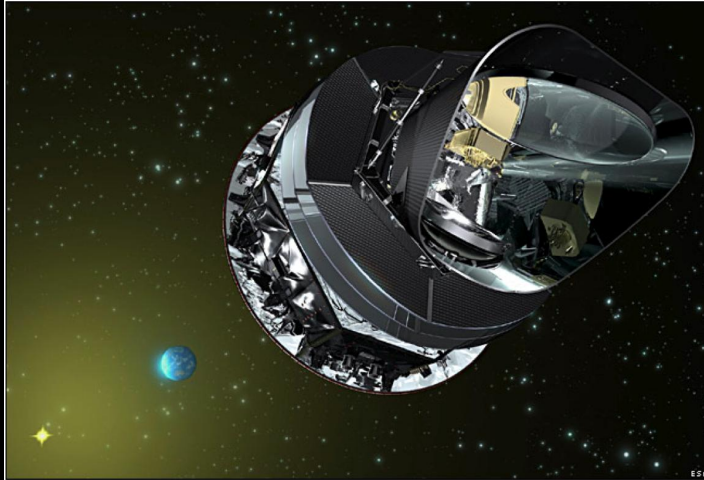
MAP990045

1964

Il residuo fossile del Big Bang: la radiazione di fondo nelle microonde



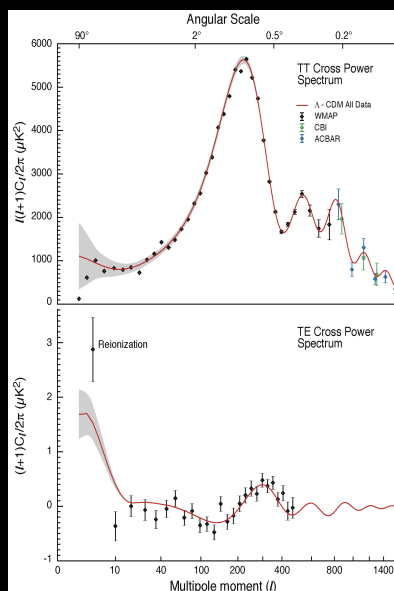
Il satellite PLANCK



In volo ora !!!

Fondamentale contributo italiano e milanese (M. Bersanelli et al., Università di Milano)

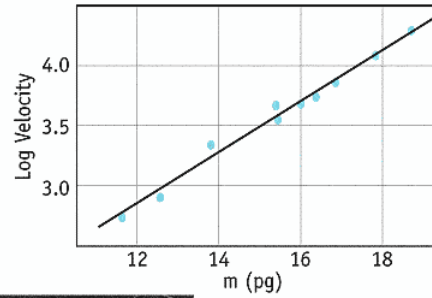
Quanto contano le disomogeneità a diverse scale angolari?



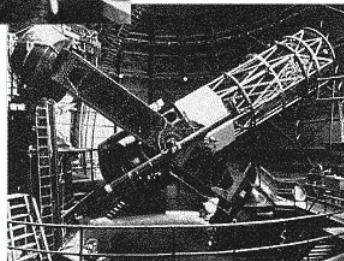
DISCOVERY OF EXPANDING UNIVERSE



Edwin Hubble

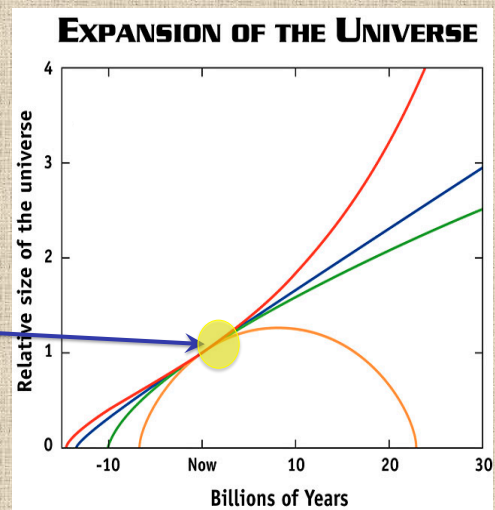
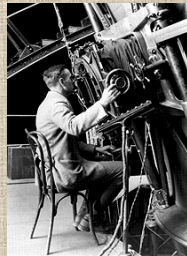


(1929)

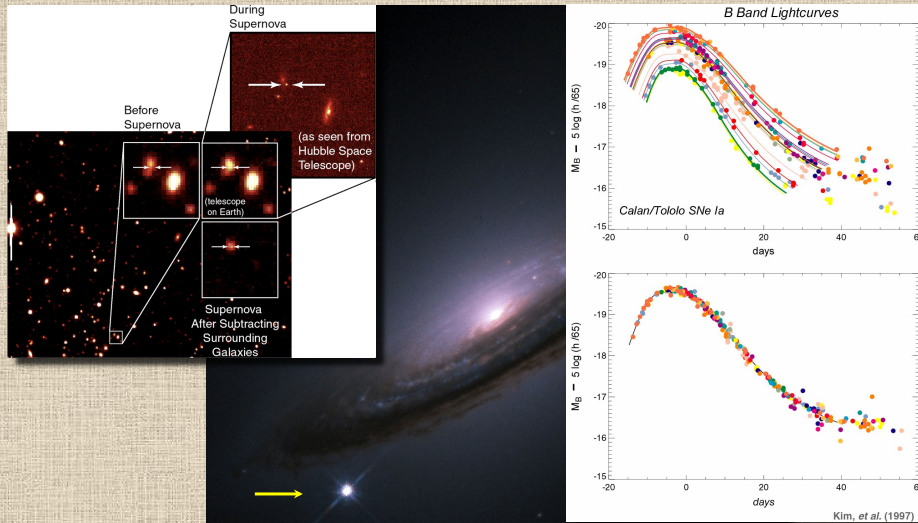


Mt. Wilson
100 Inch
Telescope

Cosa sappiamo della velocità di espansione nel passato?



Se vogliamo andare ancora piu' lontano, dobbiamo trovare delle "candele standard" intrinsecamente molto luminose: le supernove di Tipo Ia



Premio Nobel per la Fisica 2011



Saul Perlmutter



Adam Riess

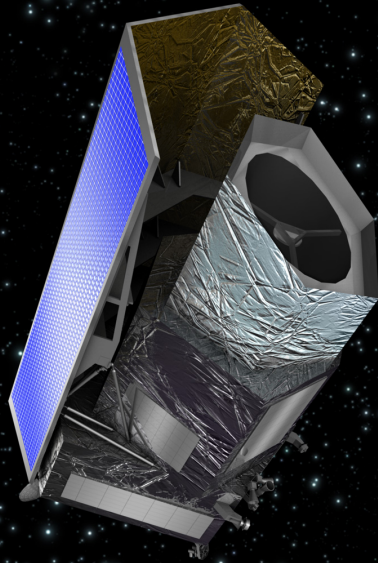


Brian Schmidt

"... per la scoperta dell'accelerazione cosmica"

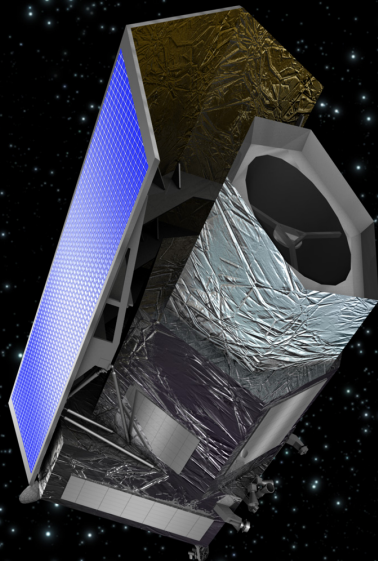


Euclid



- Telescopio da 1.2 m
- Imager visibile
- Imager infrarosso
- Spettrografo infrarosso
- Lancio 2019
- La prossima missione medio-grande dell'Agenzia Spaziale Europea
- Francia-Italia-UK nazioni leader del progetto

Euclid



OBIETTIVO:

- Costruire una mappa della materia oscura e luminosa su tutto il cielo (fuori dalla Galassia)
- Comprendere la natura della materia oscura
- Risolvere il problema dell'espansione accelerata