

# Nature or Nurture: The formation and evolution of galaxies

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**This is a galaxy**





so is this...

Large  
Magellanic Cloud



as is this.





# Galaxies are diverse



# Why do galaxies look like this? What processes shape their growth?

Milky Way (NGC 6744)



Large  
Magellanic Cloud



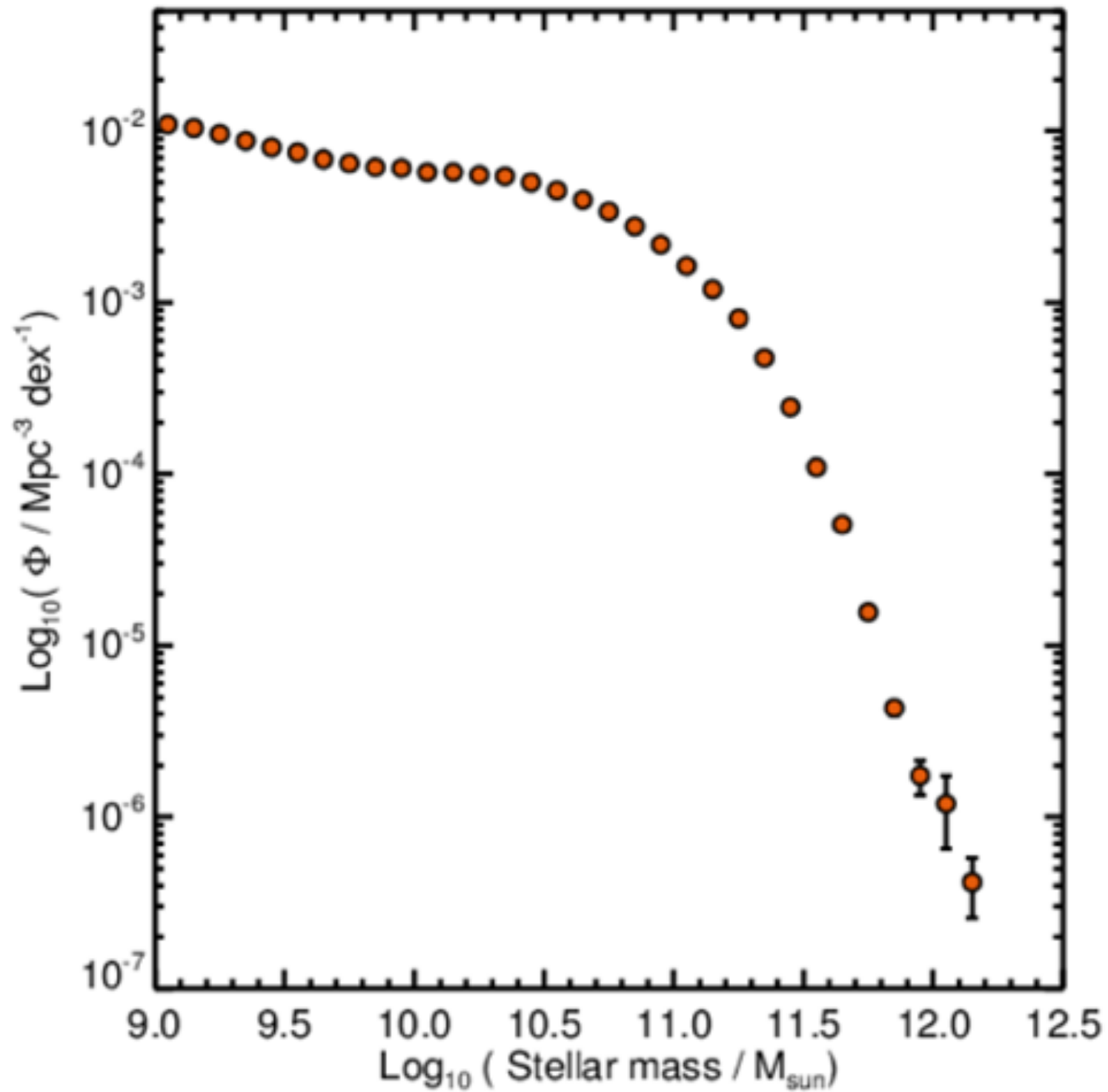
M87





# How are they distributed?

Number of galaxies



(McGee et al. 2014a)

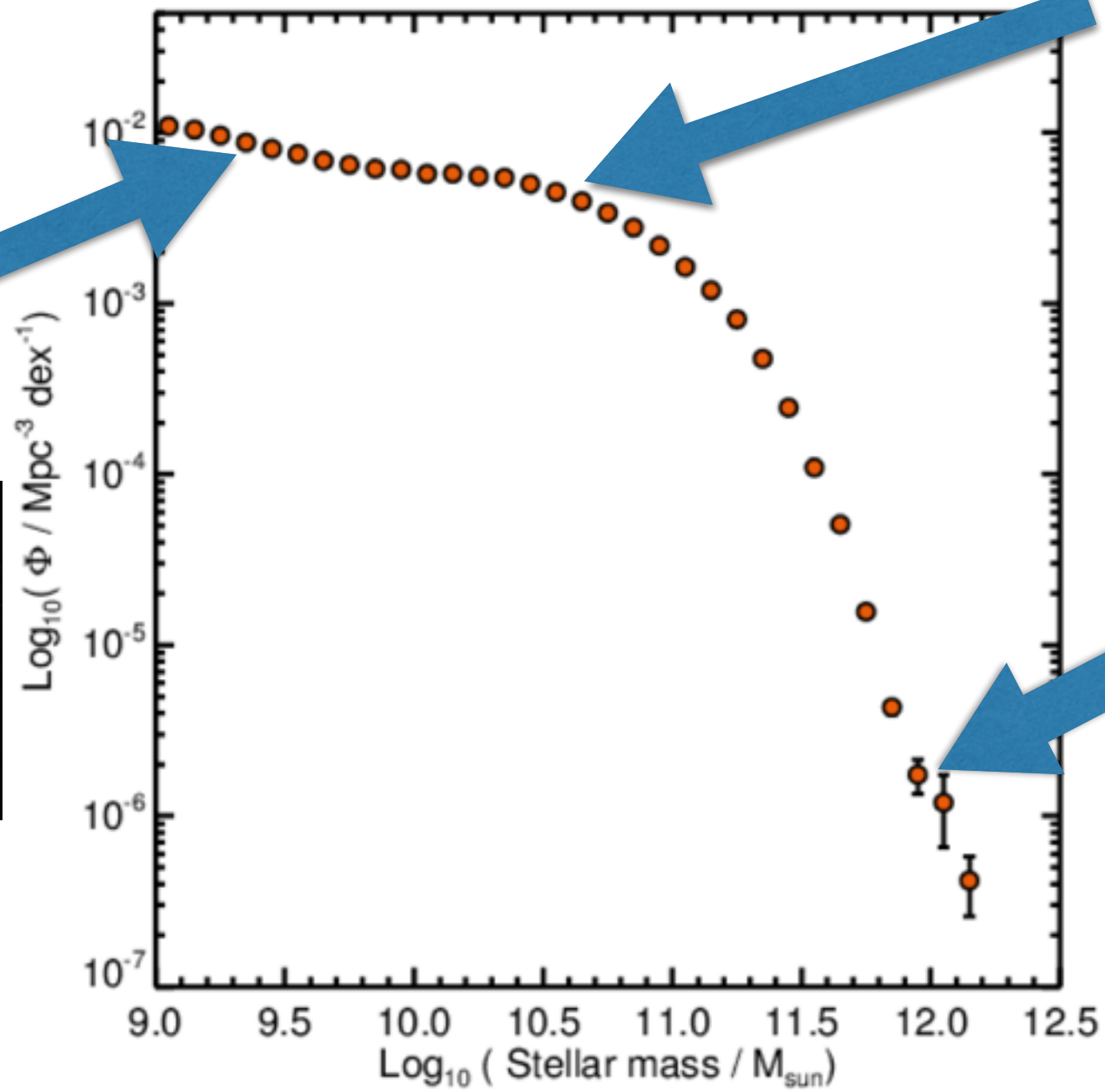
Total galaxy mass

# How are they distributed?

Milky Way (NGC 6744)



Large Magellanic Cloud



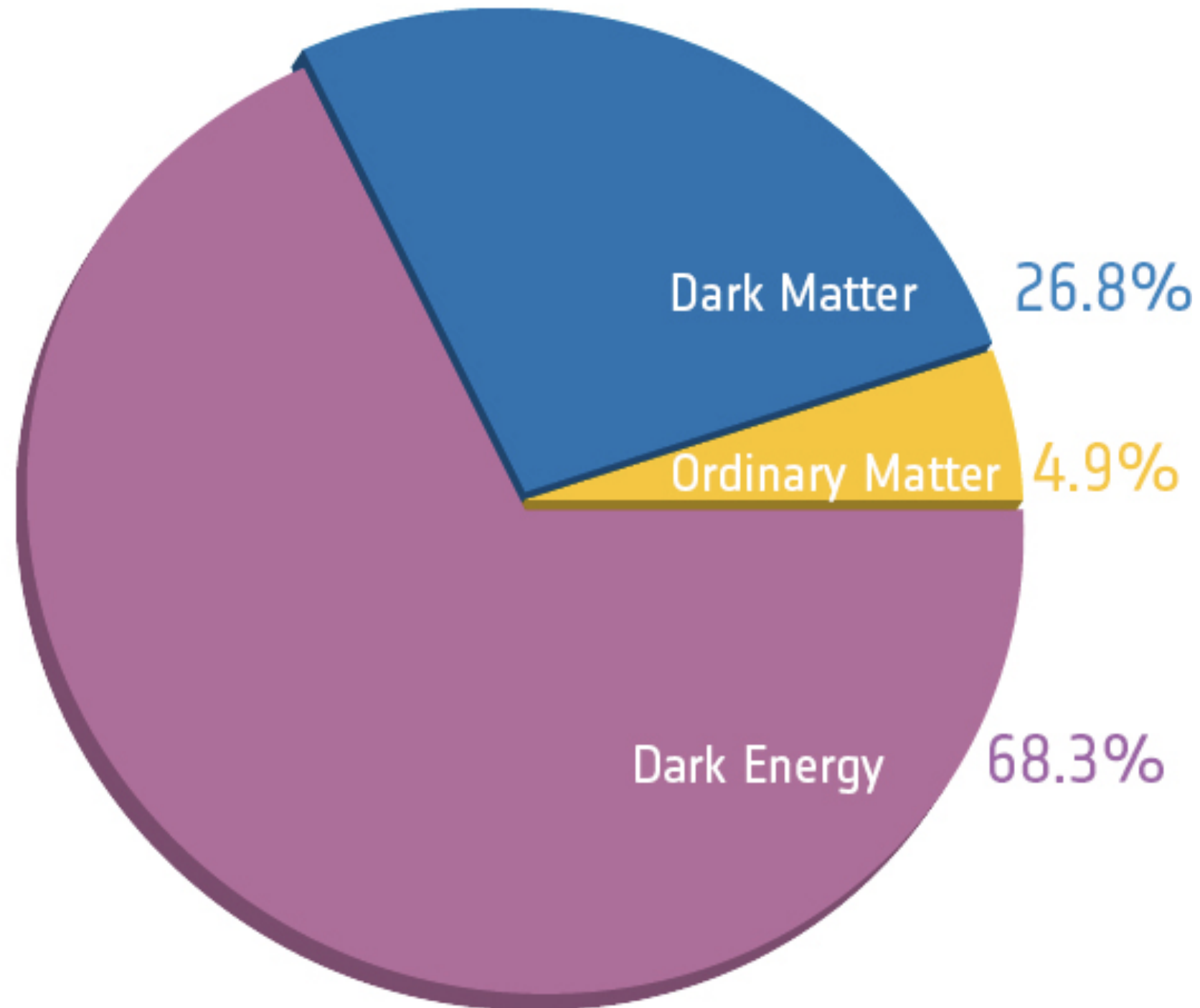
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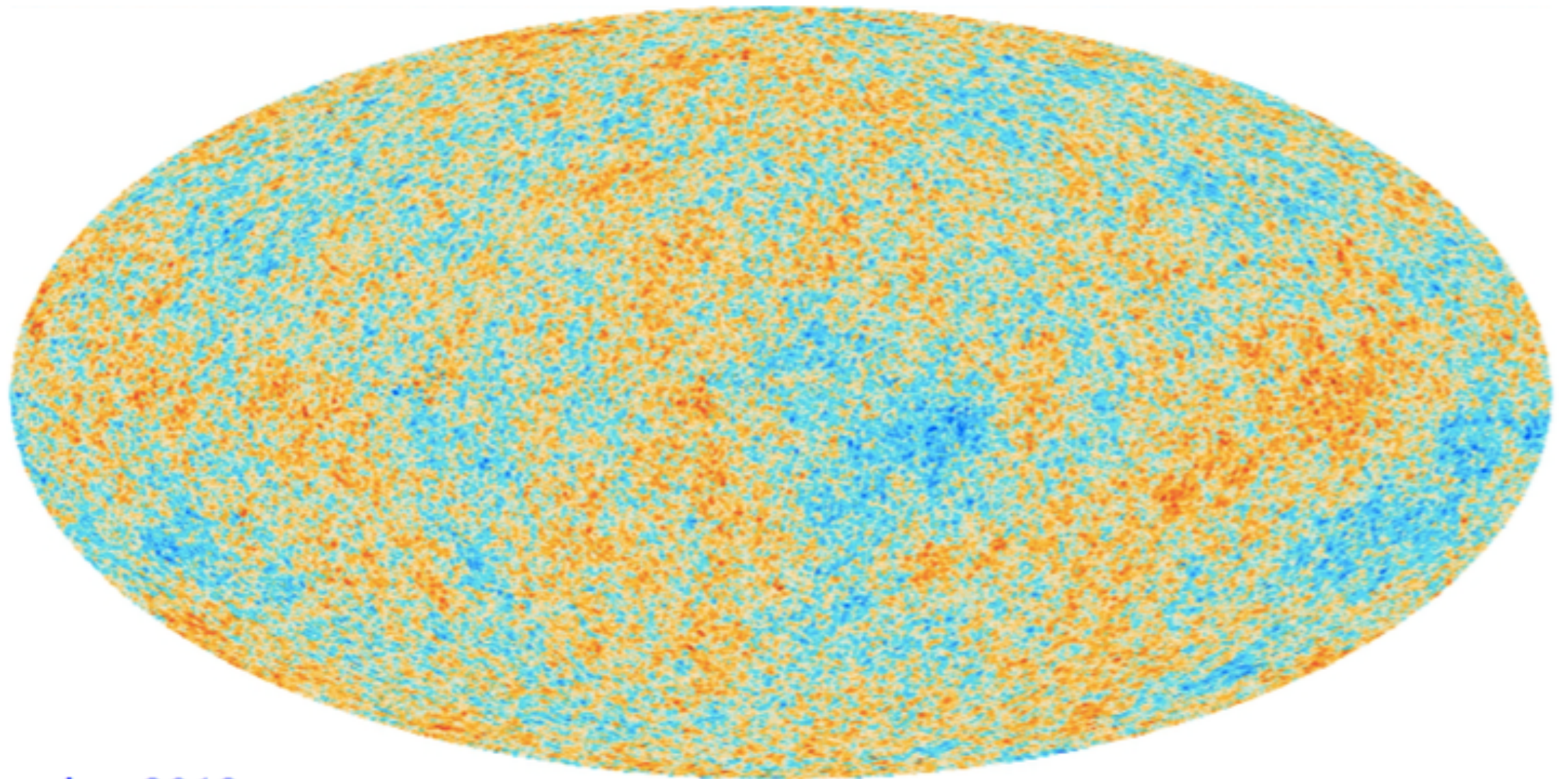
(McGee et al. 2014a)



# The cosmological model



# Snapshot of the early Universe

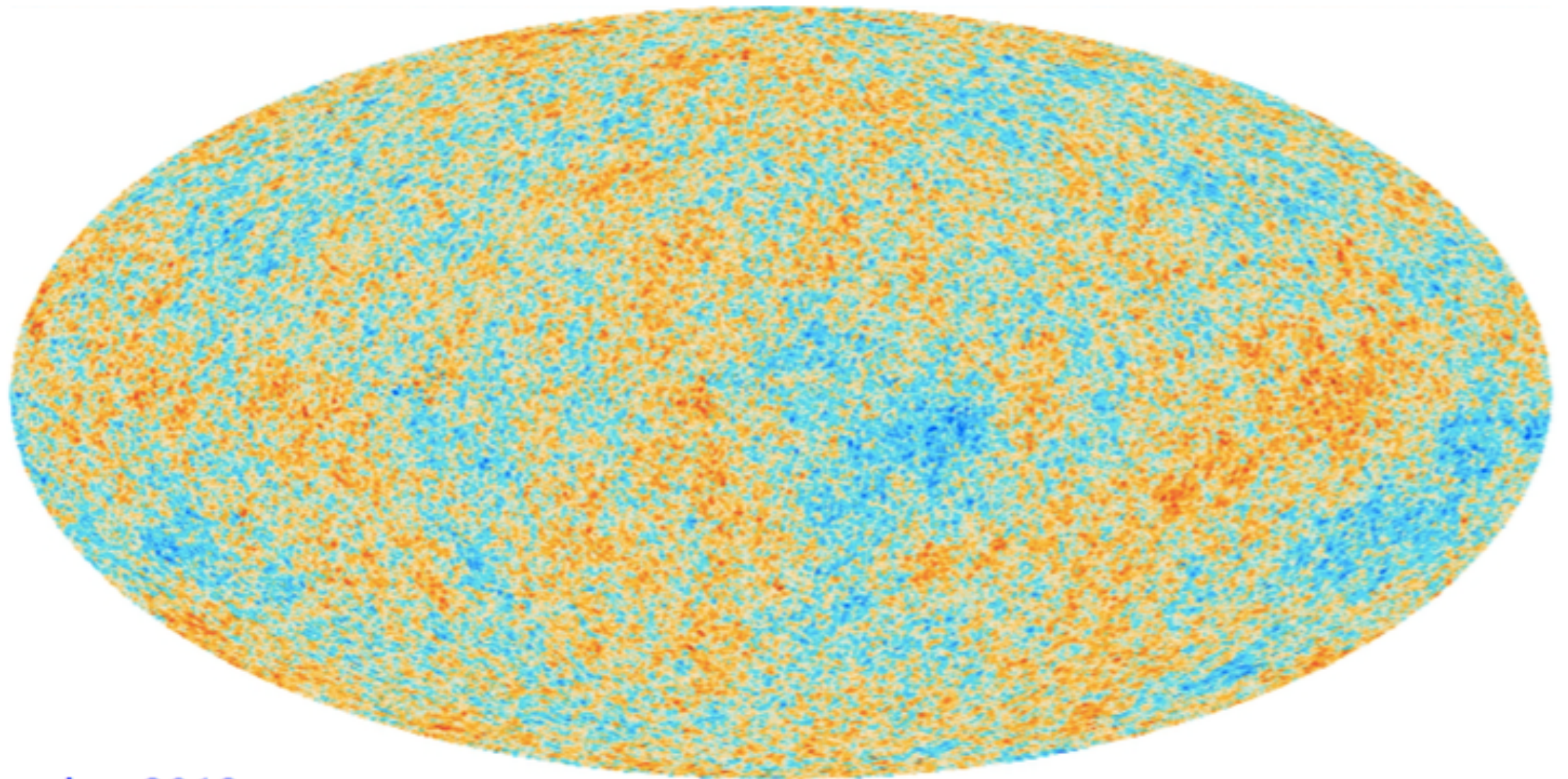


Planck Collaboration 2013

-500  500  $\mu\text{K}_{\text{CMB}}$



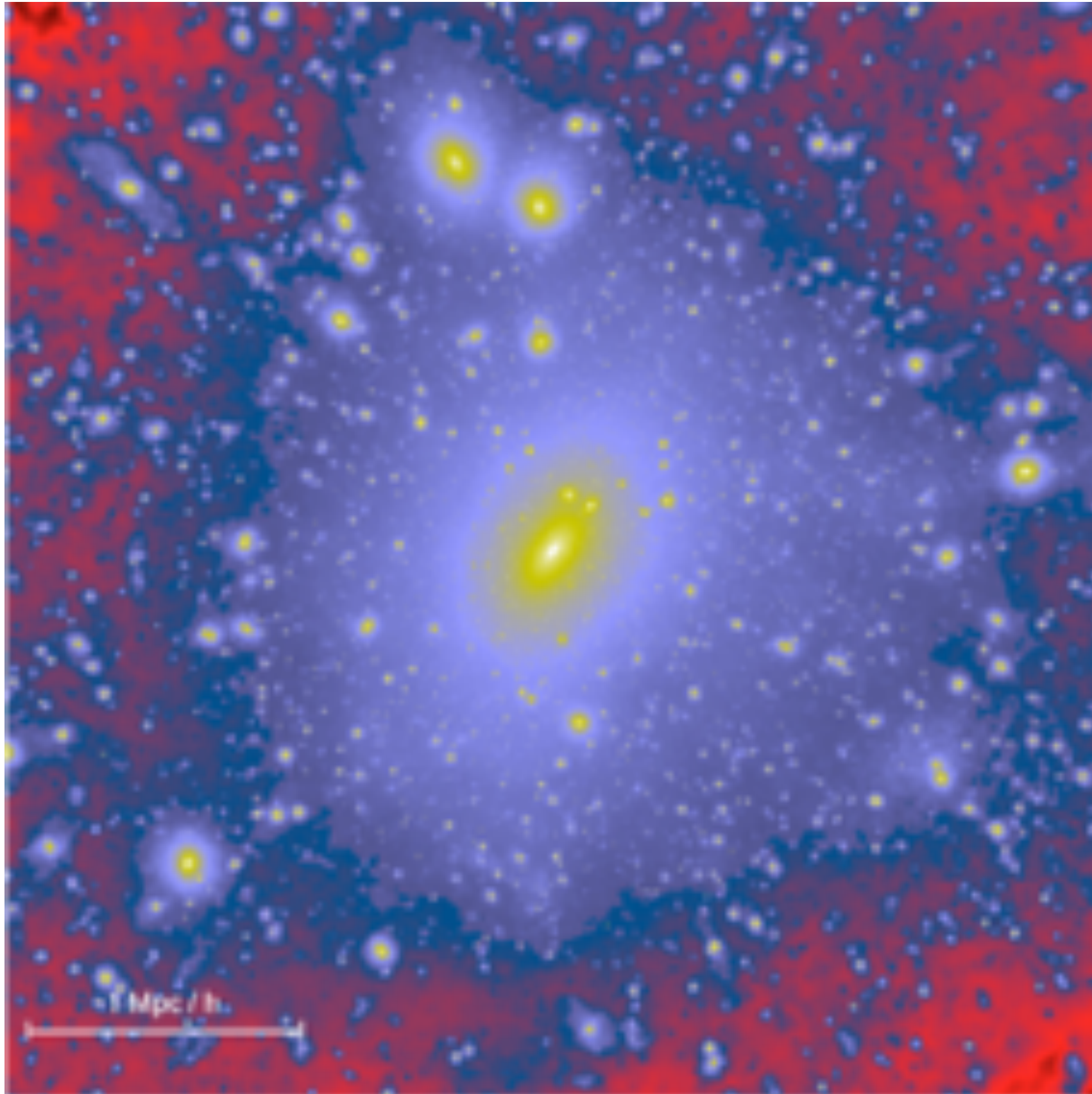
# Snapshot of the early Universe



What shapes galaxies?

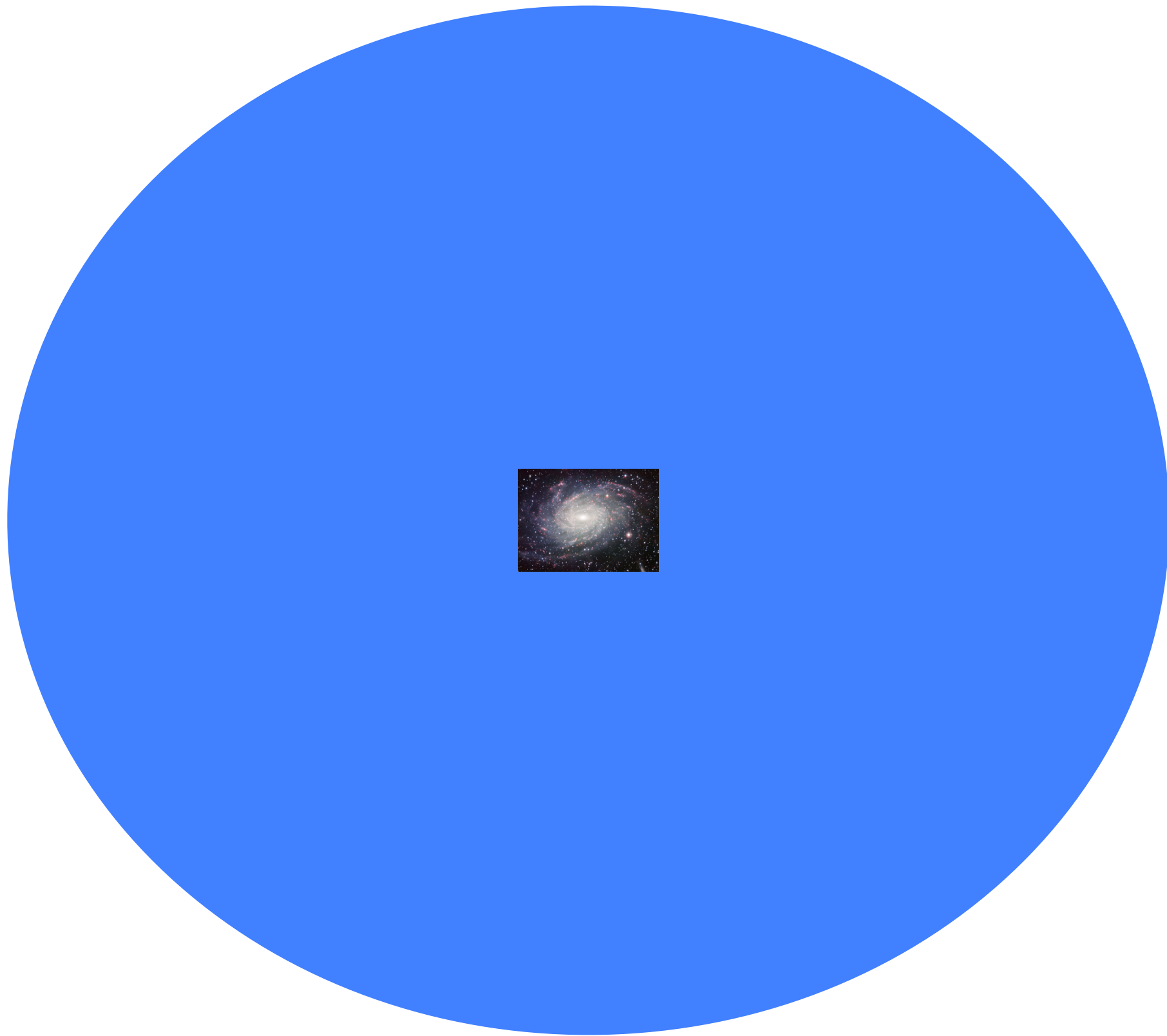


# It's mostly gravity... and dark energy



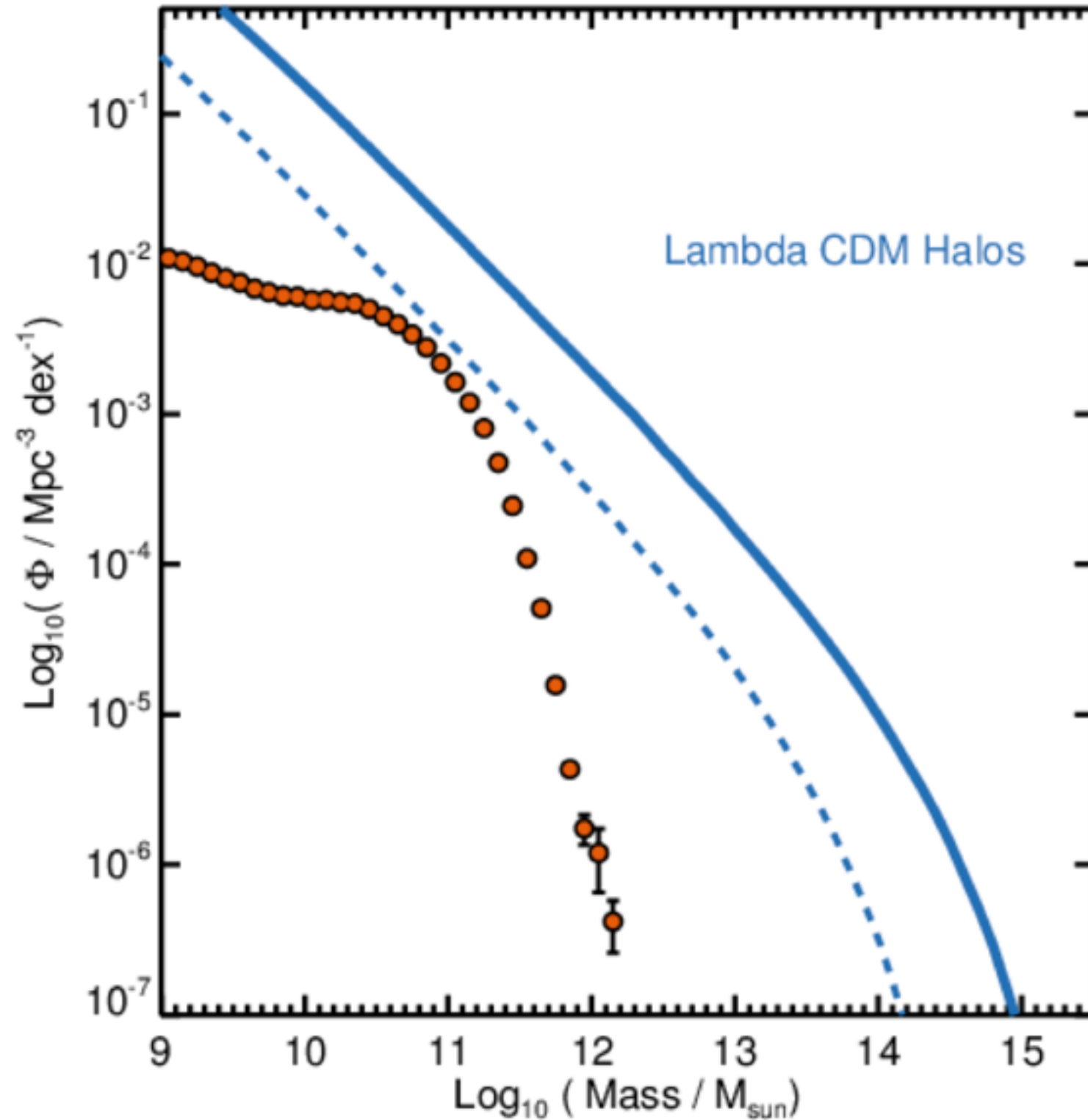
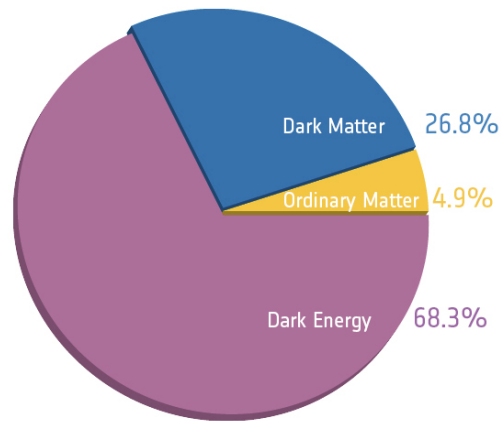
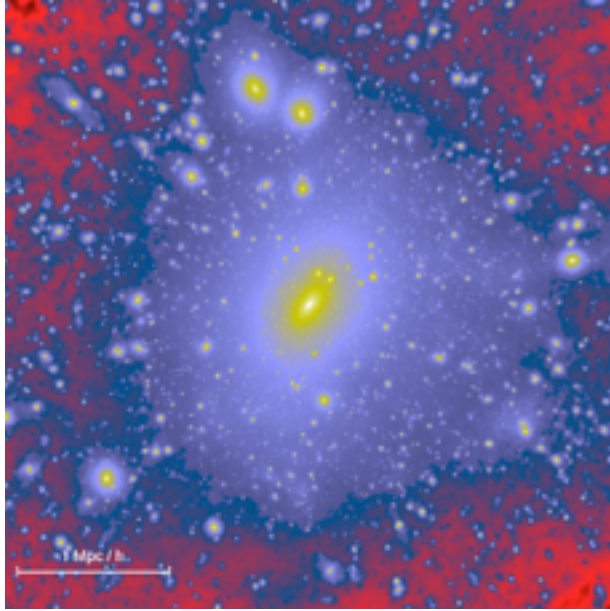


Milky Way (NGC 6744)



**Dark Matter Halo**

# But not just gravity and dark energy

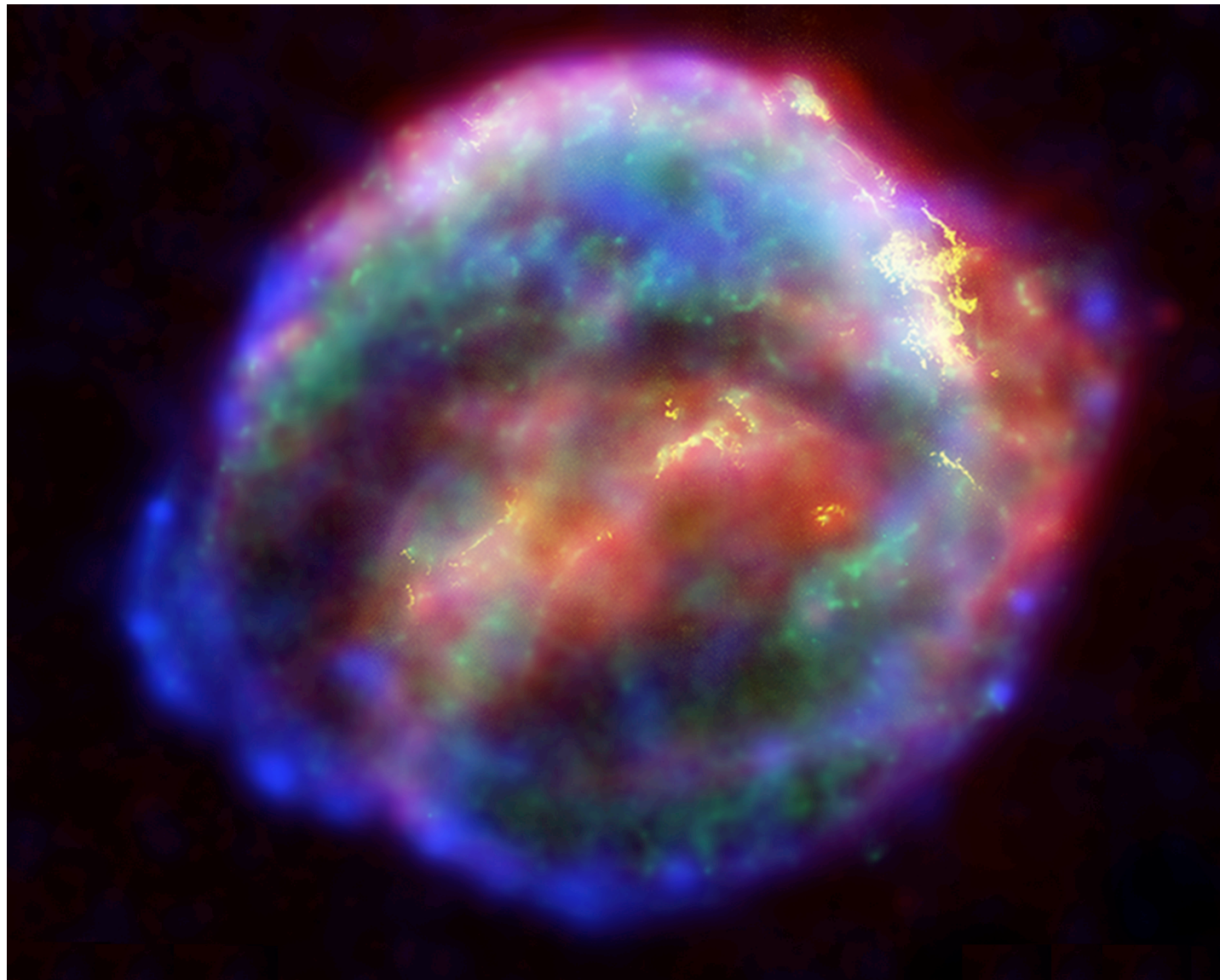


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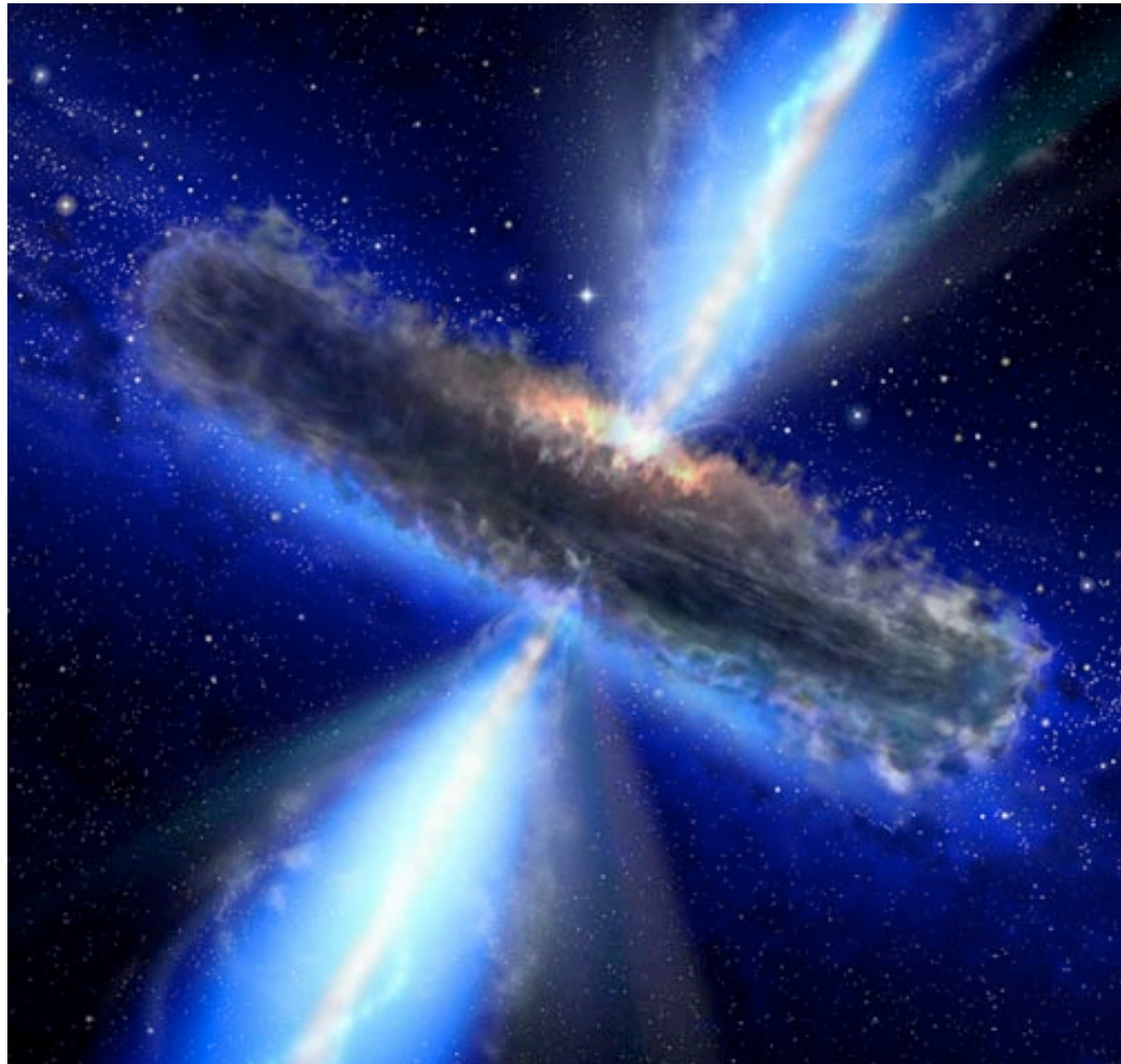




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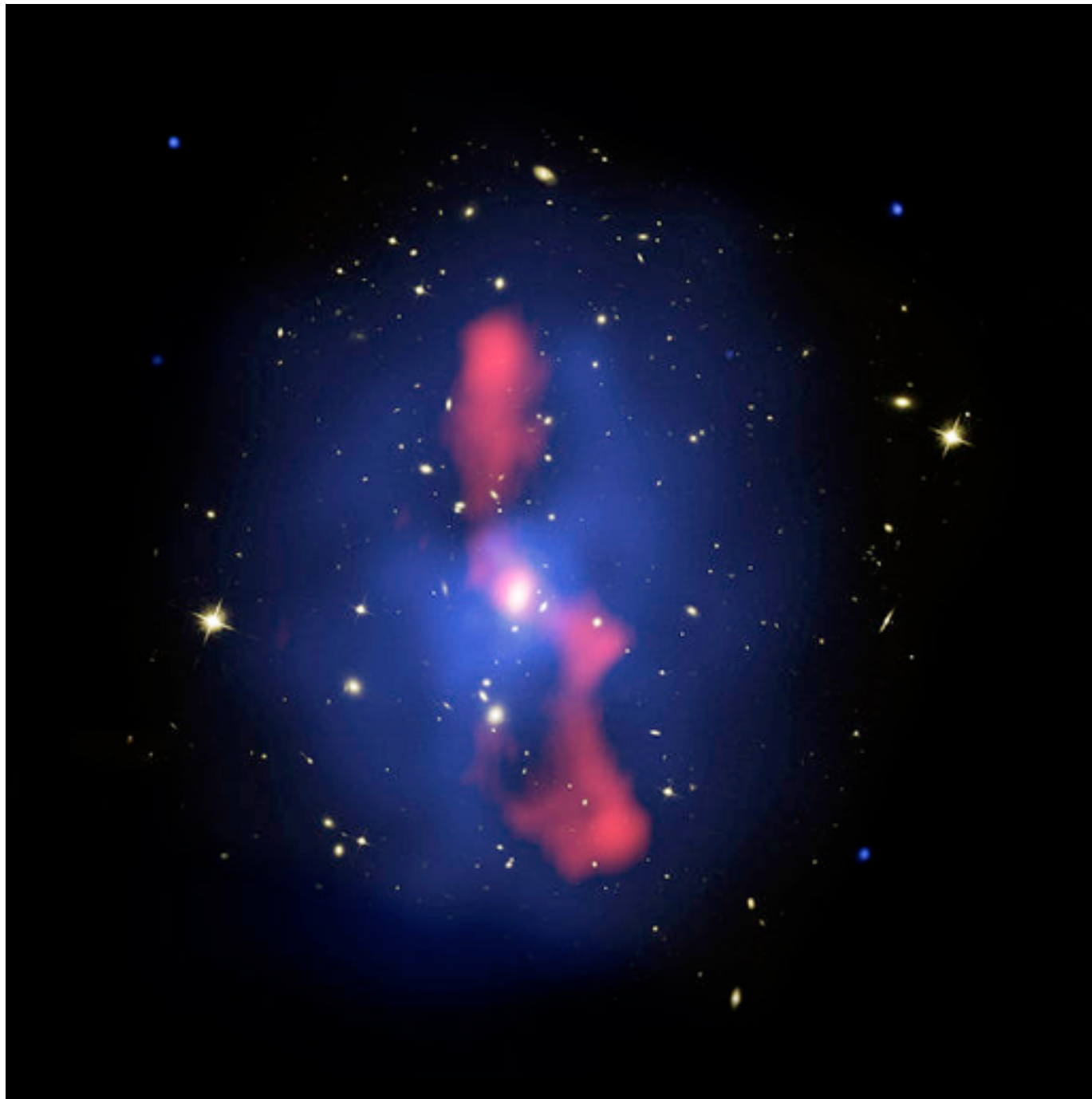
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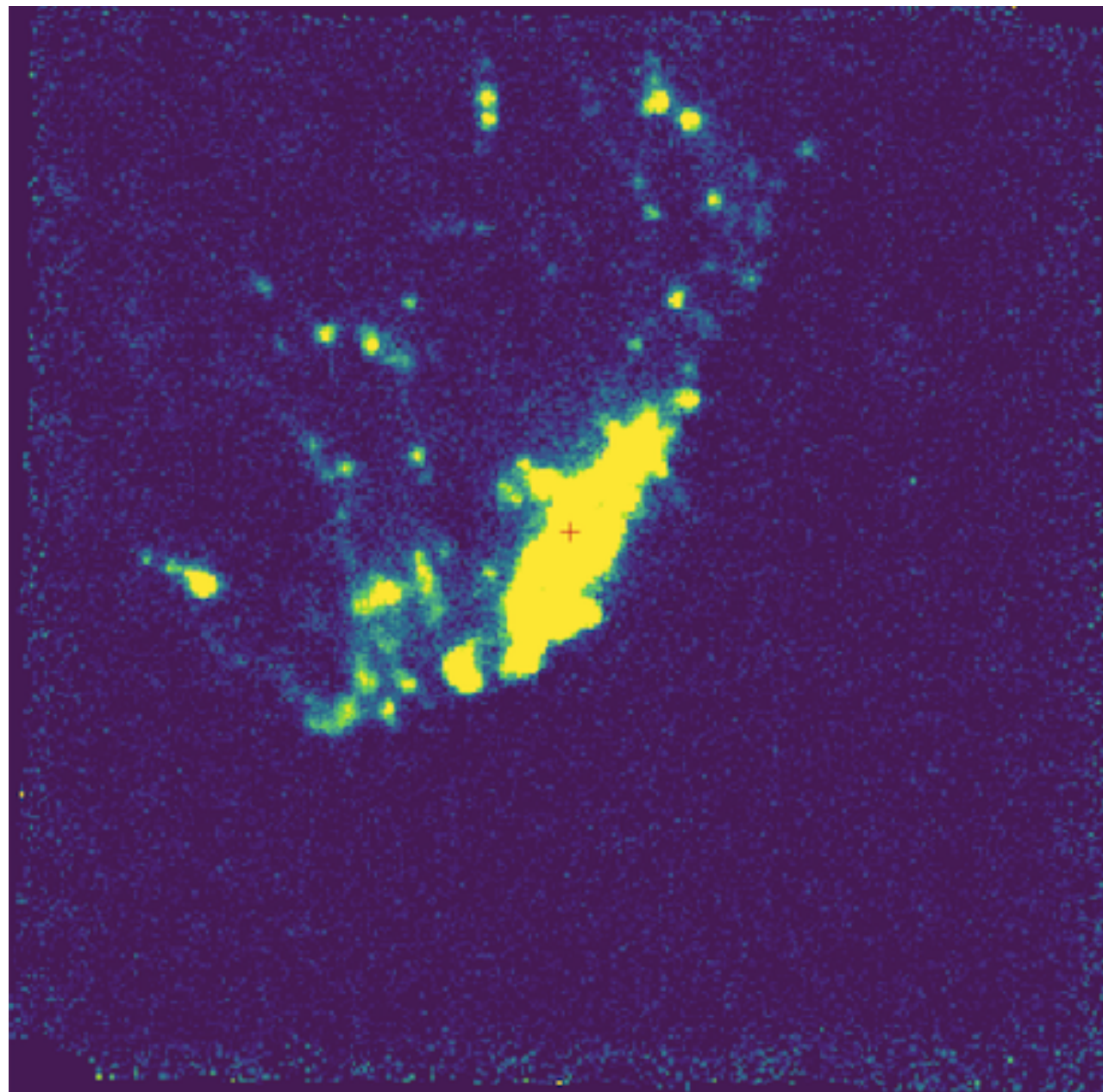


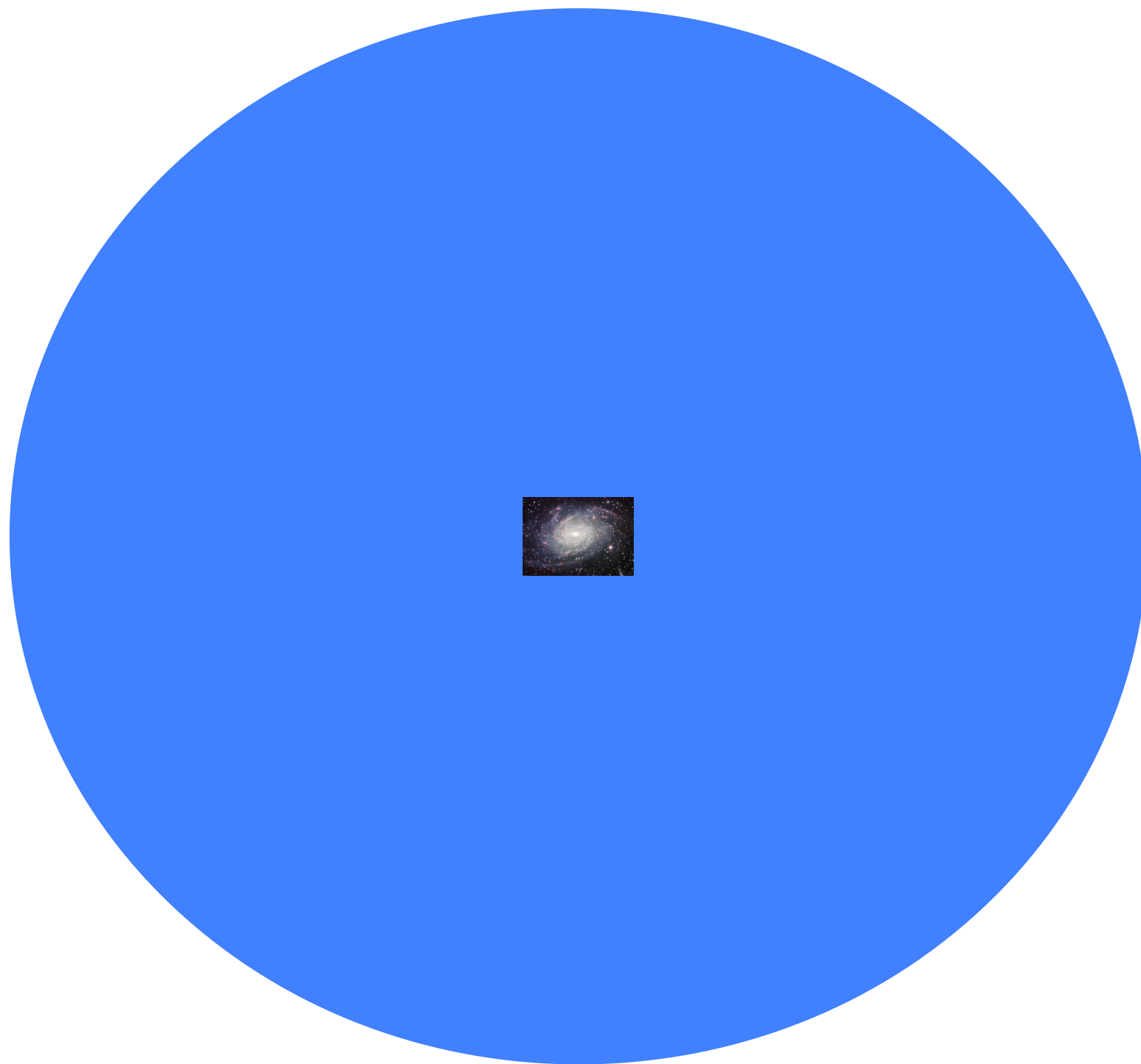
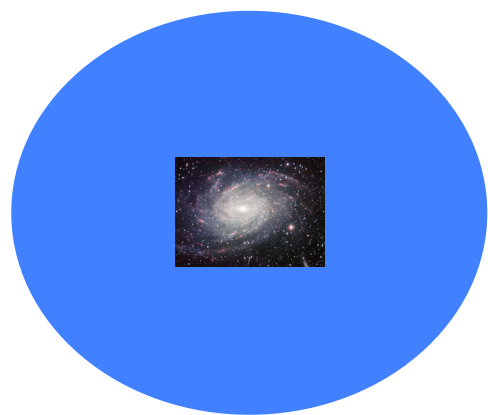
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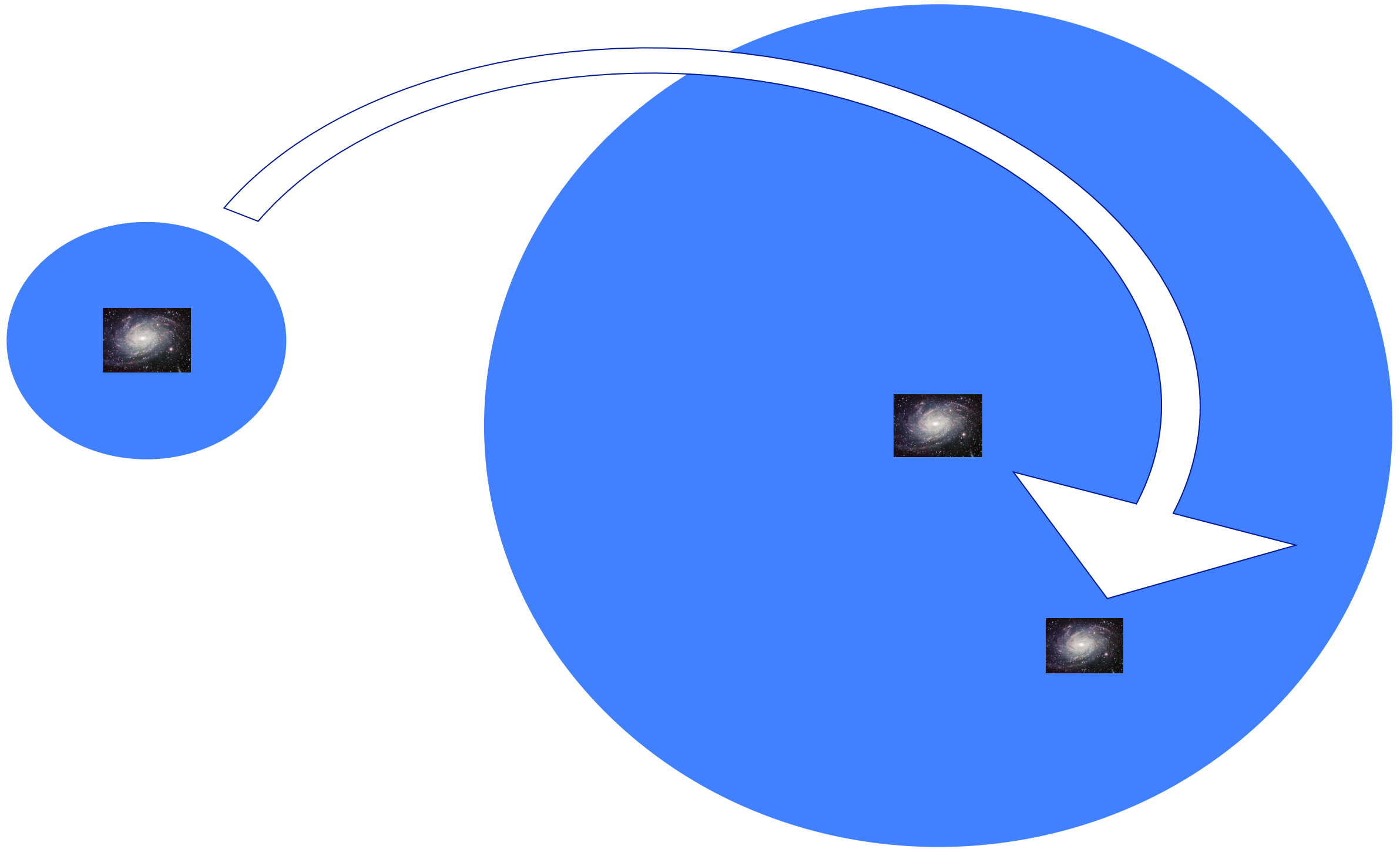
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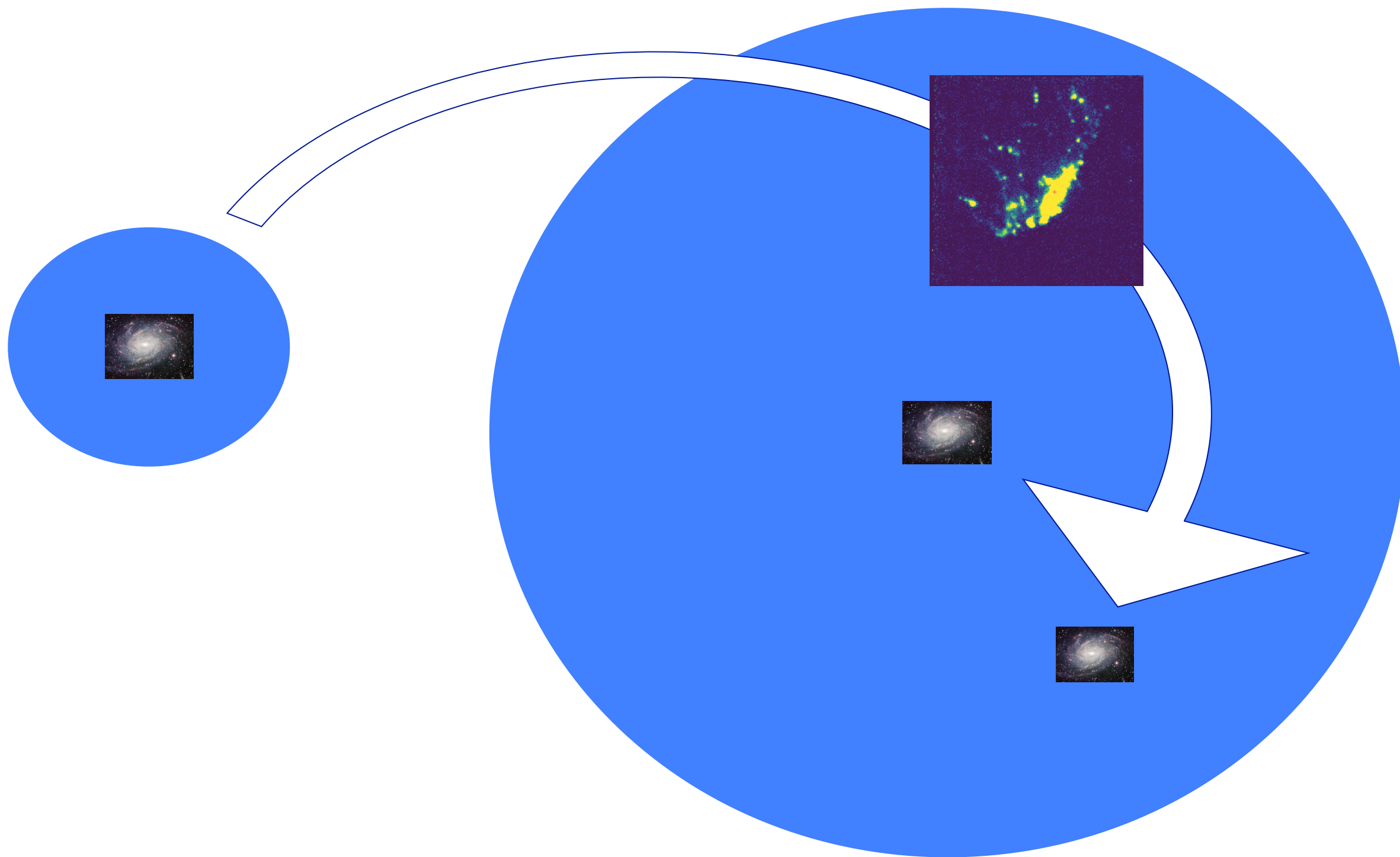
... and environmental processes.













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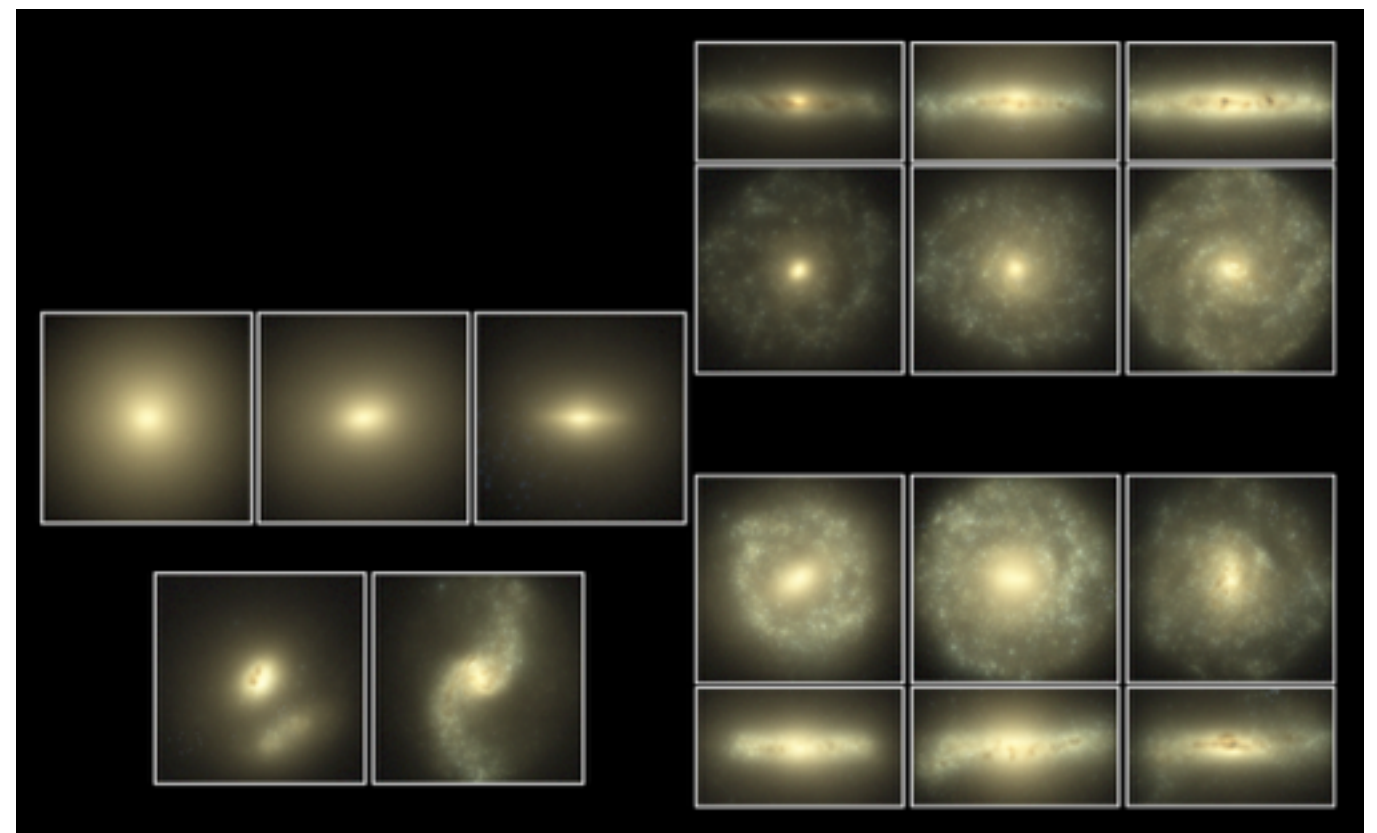


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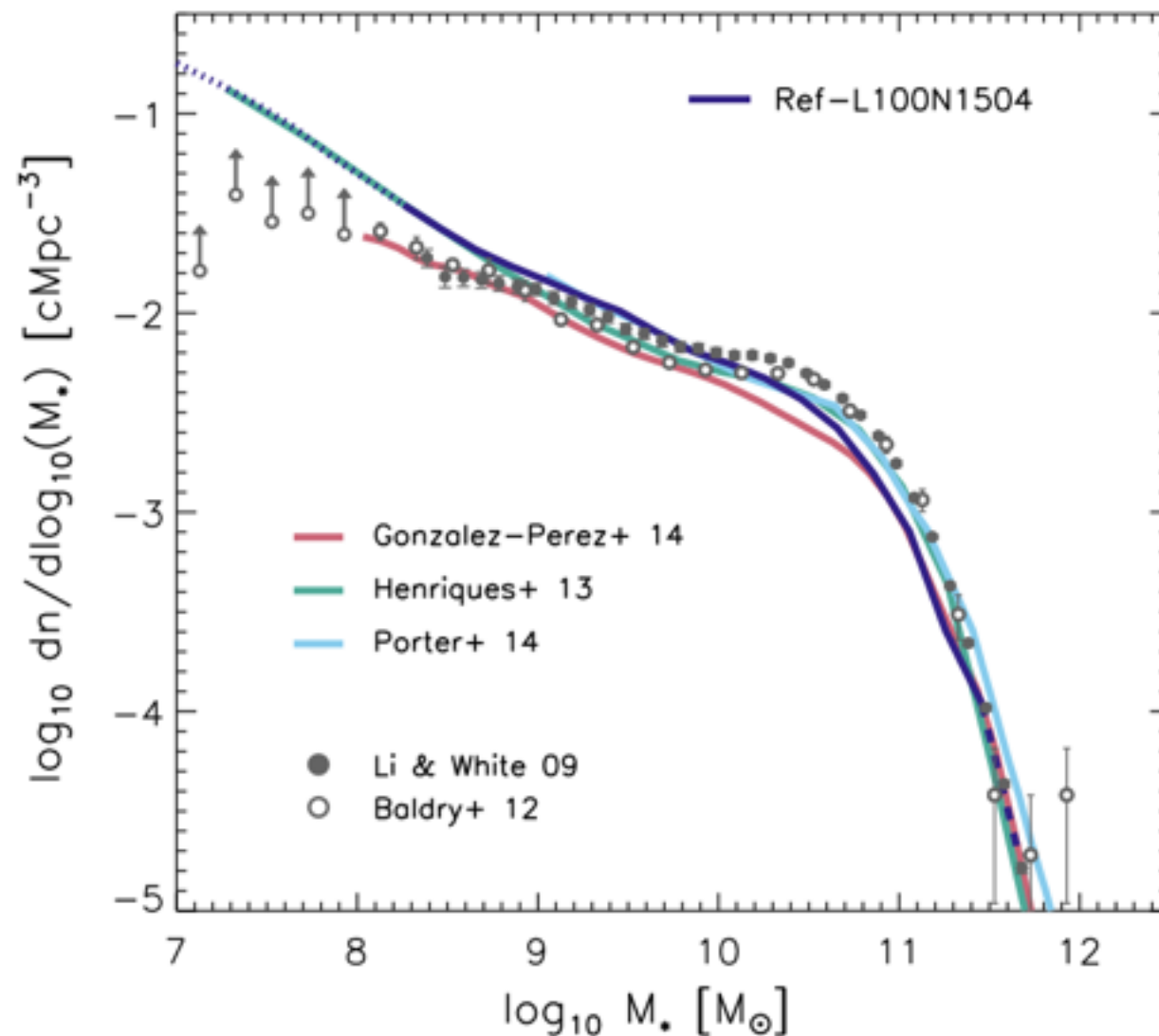


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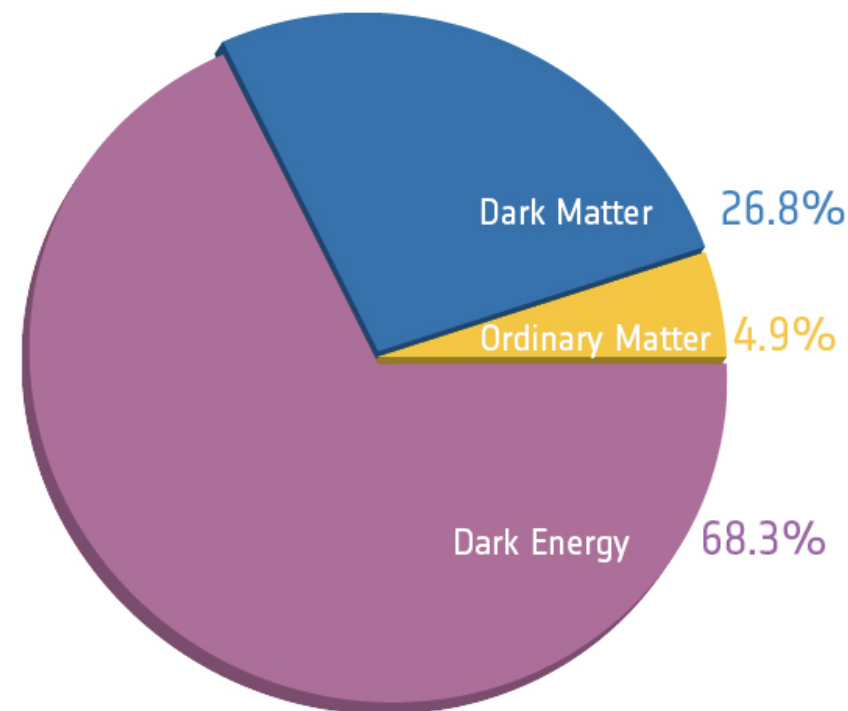


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**But what are these things?!?!**