

*Charles Sven*

*presents*

# *Physics of the CMB*

*[the cosmic microwave  
background radiation]*

*7/27/10*

# What is the CMB

- Radiation, bombarding the earth from all directions [isotropic] with a uniformly very low temp. of 2.725 above absolute zero on the Kelvin scale.
- This radiation began life with the Big Bang at temperatures far exceeding a billion Kelvin some 13.7 billion years ago.

**[isotropic - the same view in every direction]**

“the observed cosmic microwave background radiation exhibits a high degree of isotropy, [an observation] that presents both satisfaction and *difficulty* for a comprehensive theory.

... it provides a strong justification for the **assumption** of *homogeneity* and isotropy that is common to most cosmological models.”

<http://www.britannica.com/EBchecked/topic/139207/cosmic-microwave-background/280807/Isotropy-in-the-cosmic-background?anchor=ref1068913>

The use of the term *homogeneity* implies that earth has the ability to measure the *CMB* at locations other than that surrounding earth. *That is*

The use of the term *homogeneity* implies that earth has the ability to measure the *CMB* at locations other than that surrounding earth. *That is Beyond our technology.*

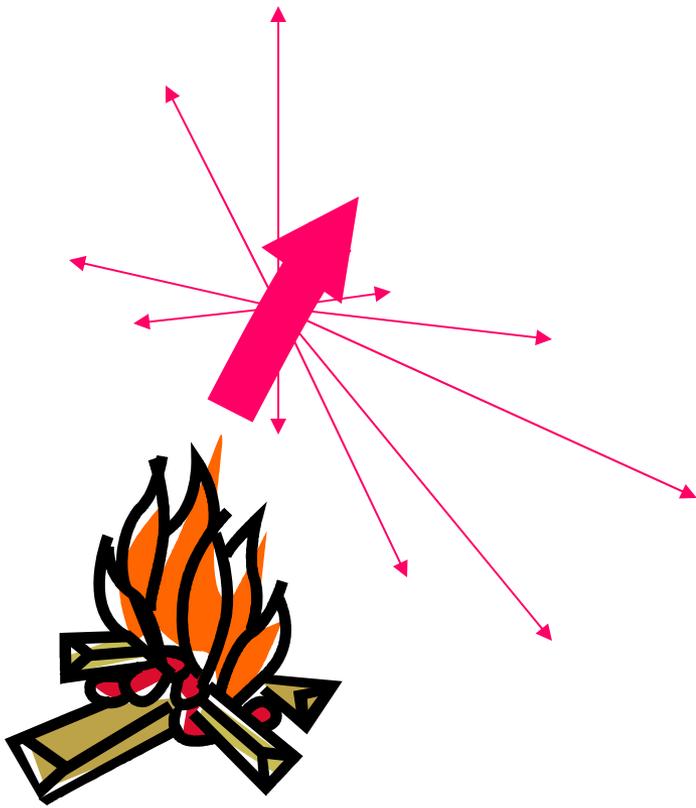
From – *The Universe Before the Big Bang* @2008 by Maurizio Gasperini

- Page 74 – “Why – ... is the background radiation so uniformly distributed over the whole observable space?”
- NOTE: we on Earth do not have sensors sampling the “whole observable space”
- Earth only observes what CMB reaches our satellites.

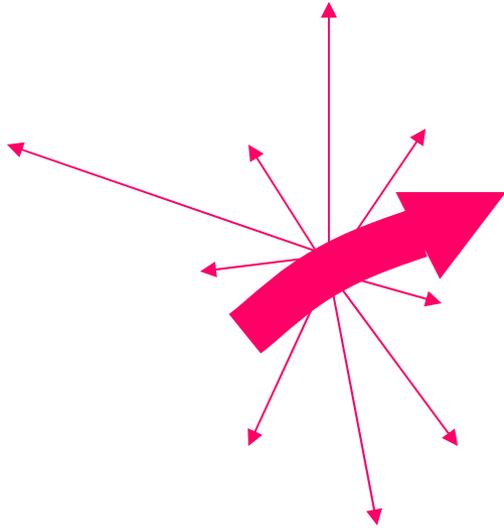
# *What we sense - example 1*

- While watching a campfire emit a flying ember, one is aware that it radiates in all directions as noted by the surrounding observing campers.
- However we only see the facing side of the current emission, **moment by moment**, directed at the viewer, not the whole path, same with the CMB as viewed by earth.

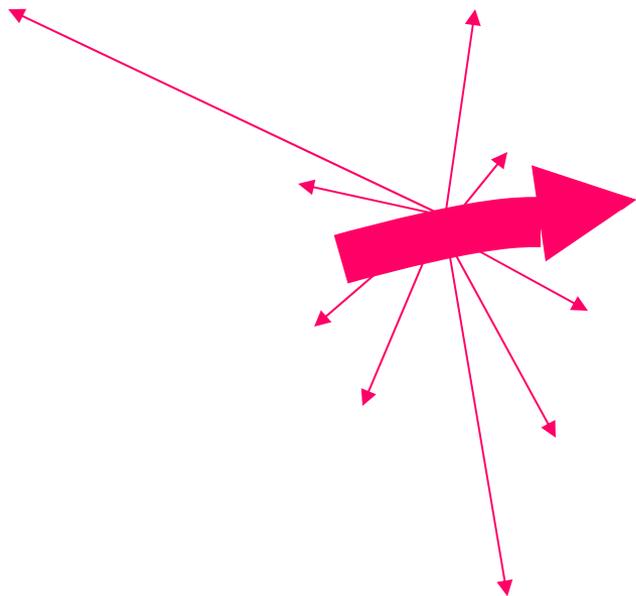




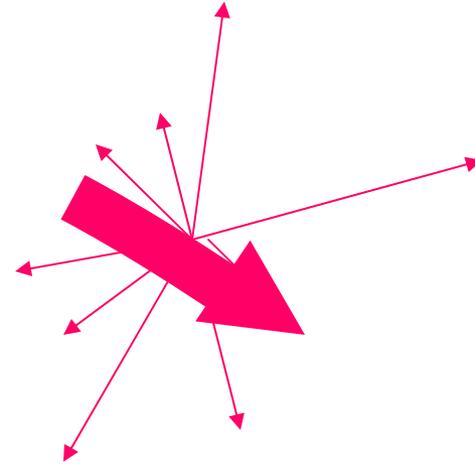
Flying embers



Flying embers



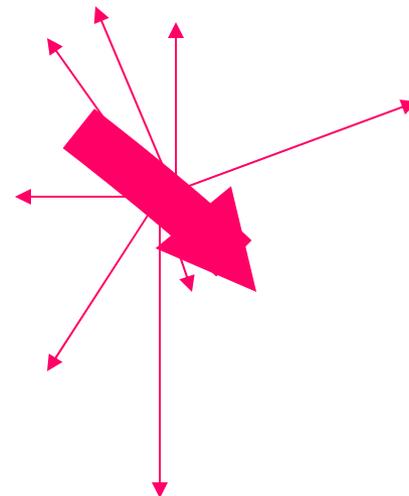
Flying embers



Flying embers

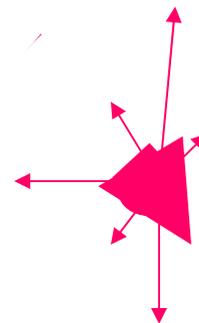


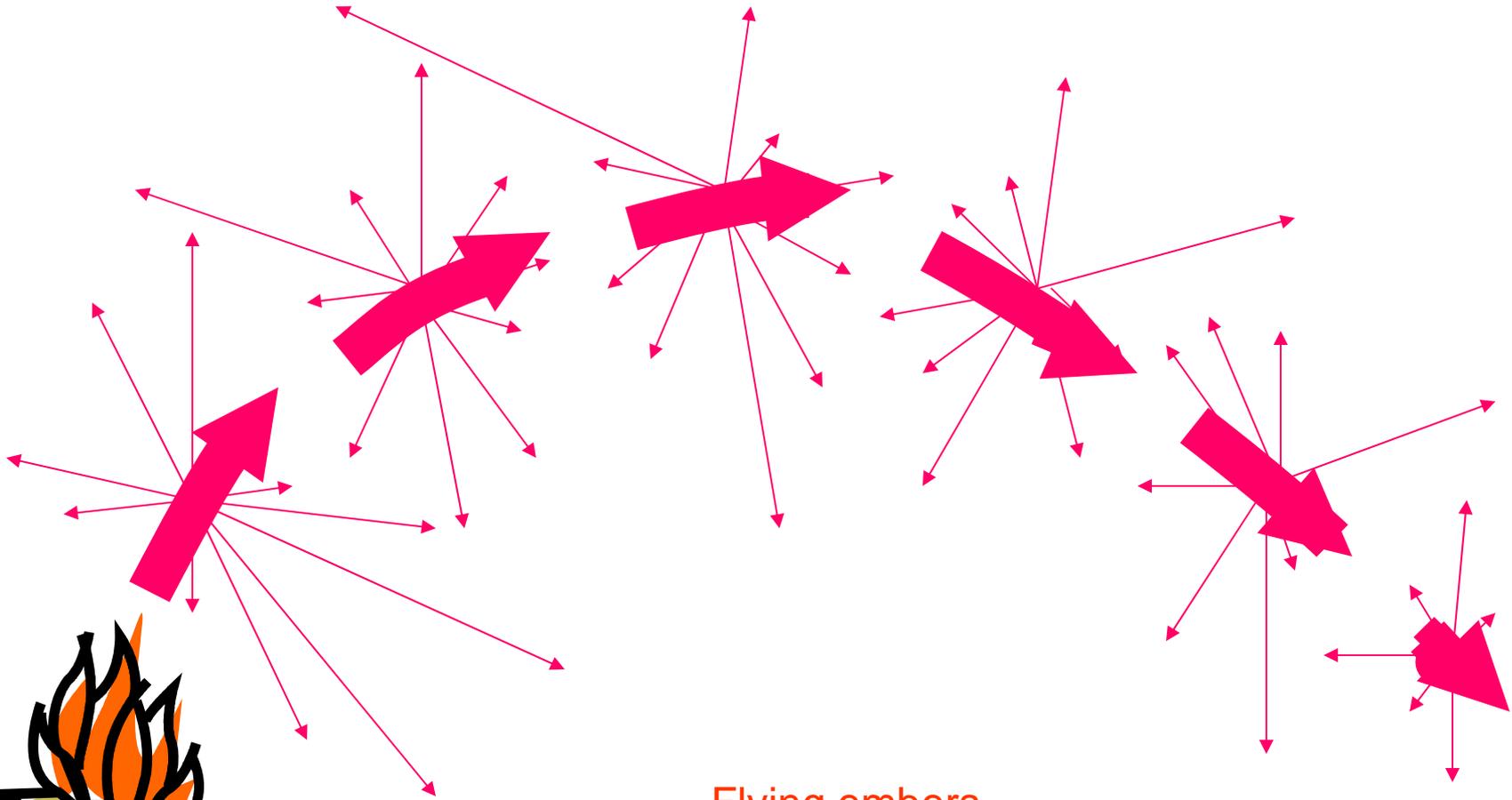
Flying embers





Flying embers

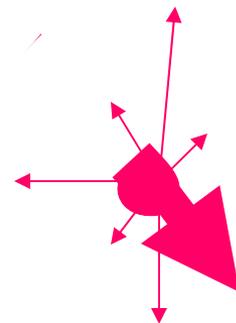




Flying embers



Flying embers

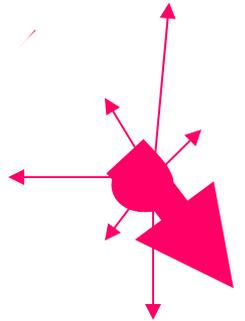


We see these embers, frame at a time,  
straight on.

No two observers receive the same view  
because each viewer has a unique  
location.

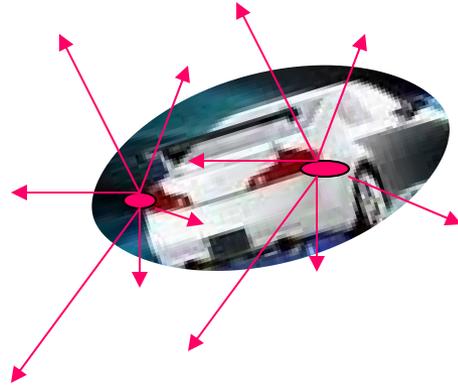


Flying embers



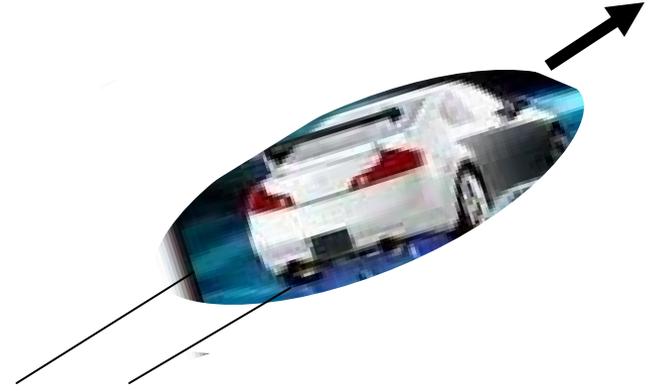
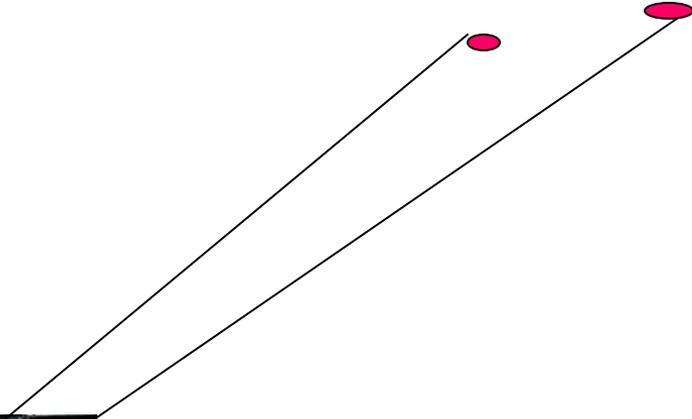
*example 2* - watching fast cars at  
night – driving away

- When one sees the *red tail lights*, we note that that is *NOT* where the car is at.



# A second example - watching fast cars at night – driving away

- When one sees the *red tail light*, we note that that is *NOT* where the car is at.
- If the car is traveling near the speed of light, like the *CMB* [When one sees the *red tail lights*] we find that the car has moved away from the viewer.

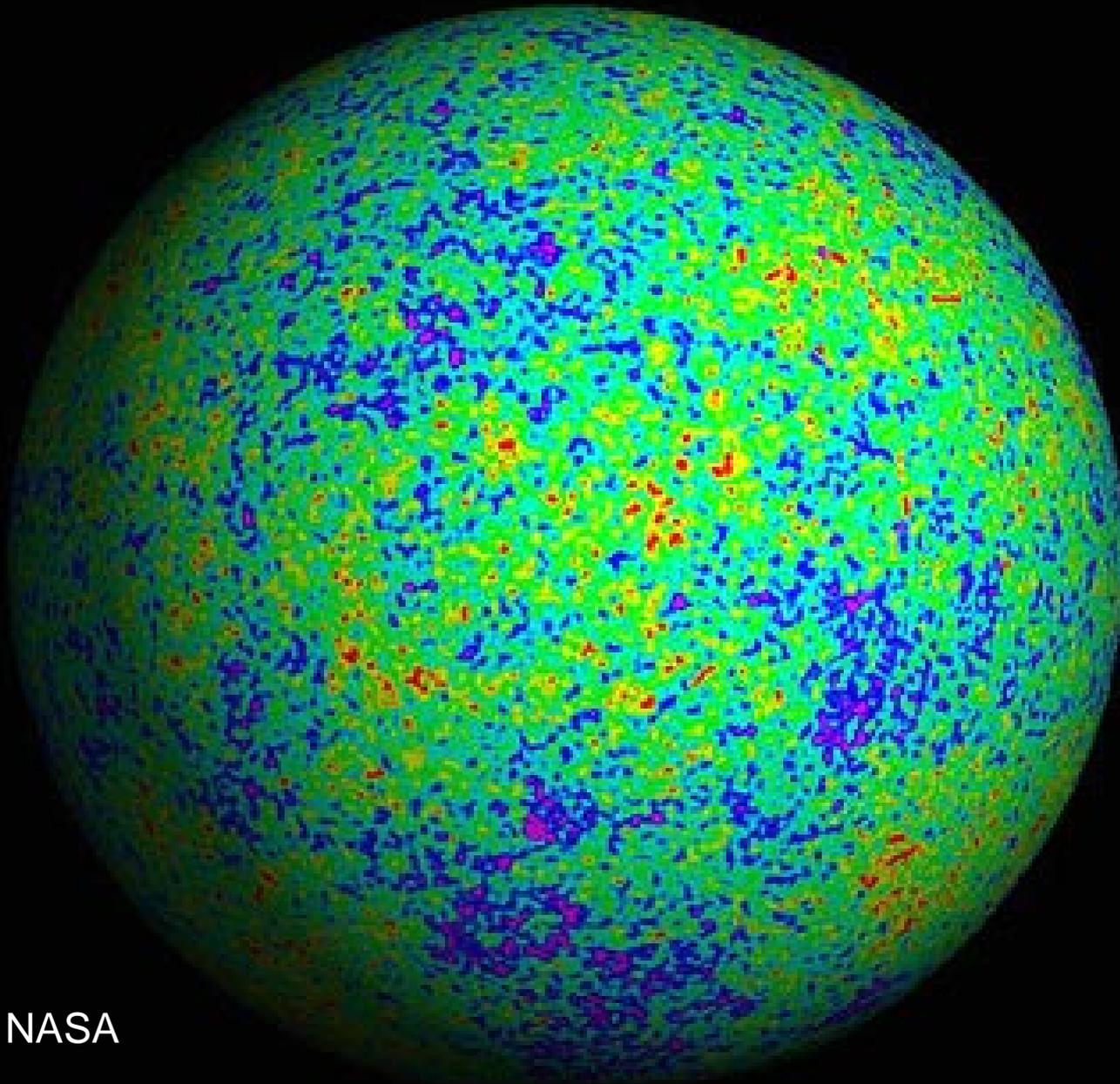


We only see where the CMB  
“embers” emanated from last

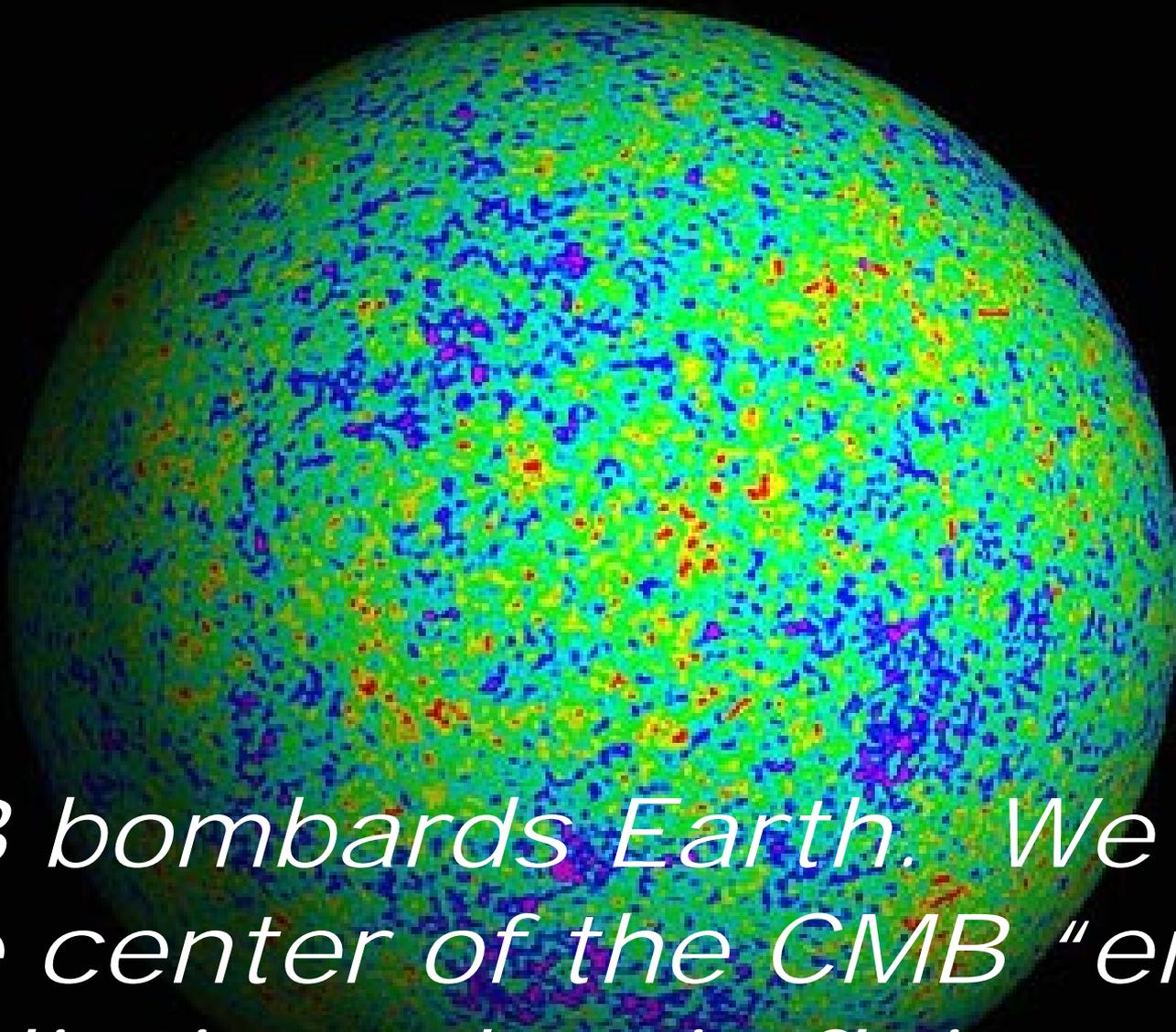
We only see where the CMB  
“embers” emanated from last

**The CMB “embers”  
traveling at near the speed  
of light have moved on.**

A picture of the CMB



Credit: NASA

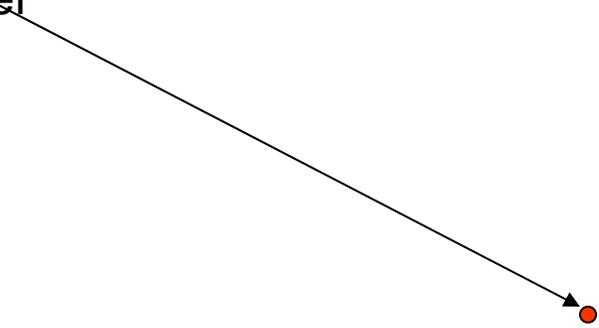


*CMB bombards Earth. We are in the center of the CMB “ember radiation” that is flying away from Earth in all directions.*

These CMB “embers” are driven by the The Big Bang Explosion -  
described at:

<http://www.allnewuniverse.com/DemoOfDarkEnergy.pdf>

Epicenter



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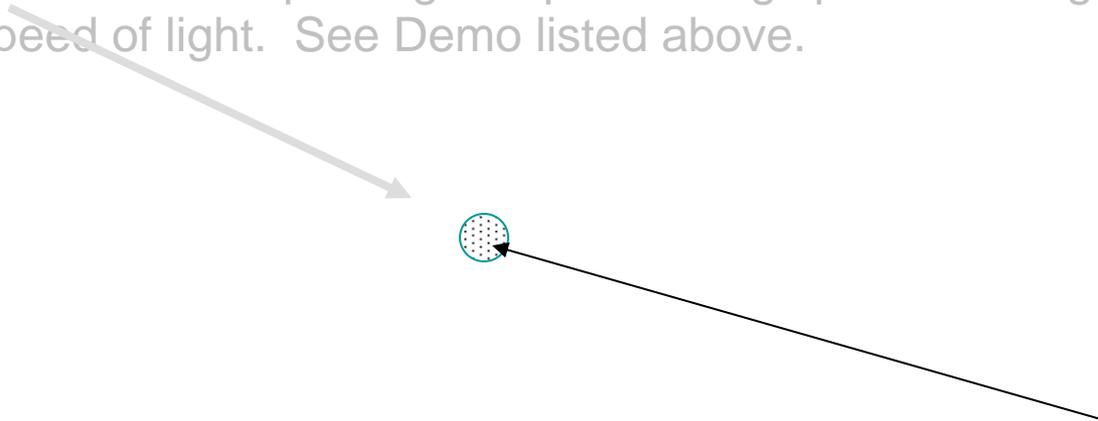
Expanding green ring - leading edge of the big bang conversion of dark energy into matter [Stanford Lab Demo] exploding into preexisting space, now running at near the speed of light. See [Demo article above](#).



- These CMB “embers” are driven by the The Big Bang Explosion described at:

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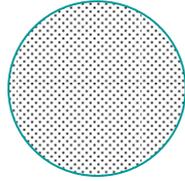
Expanding green ring - leading edge of big bang conversion of dark energy into matter exploding into preexisting space running at near the speed of light. See Demo listed above.

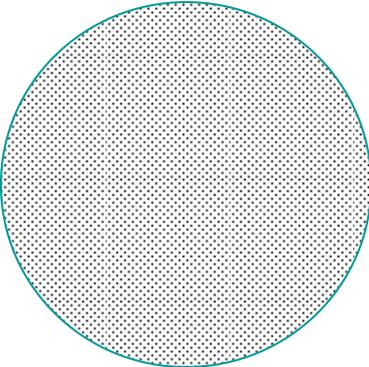


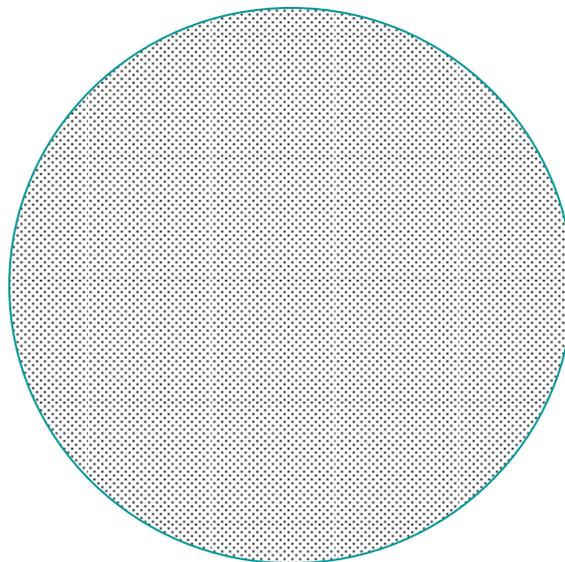
The Big Bang Explosion continues to push out the matter [black dots] converted from dark energy, as demonstrated at Stanford Labs. First out moves the fastest, as expected from any expiring explosion, The closest to the center [including earth’s atoms] moves the slowest. All these dots eventually formed galaxies.

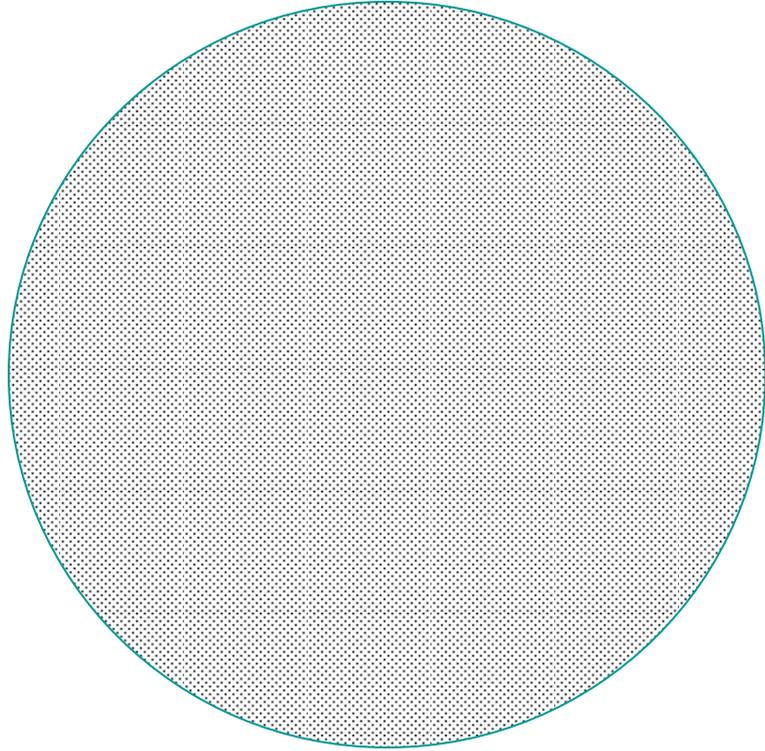
Note: no explosions are instantaneous, they start, they continue to consume their fuel and end, all in a few moments.

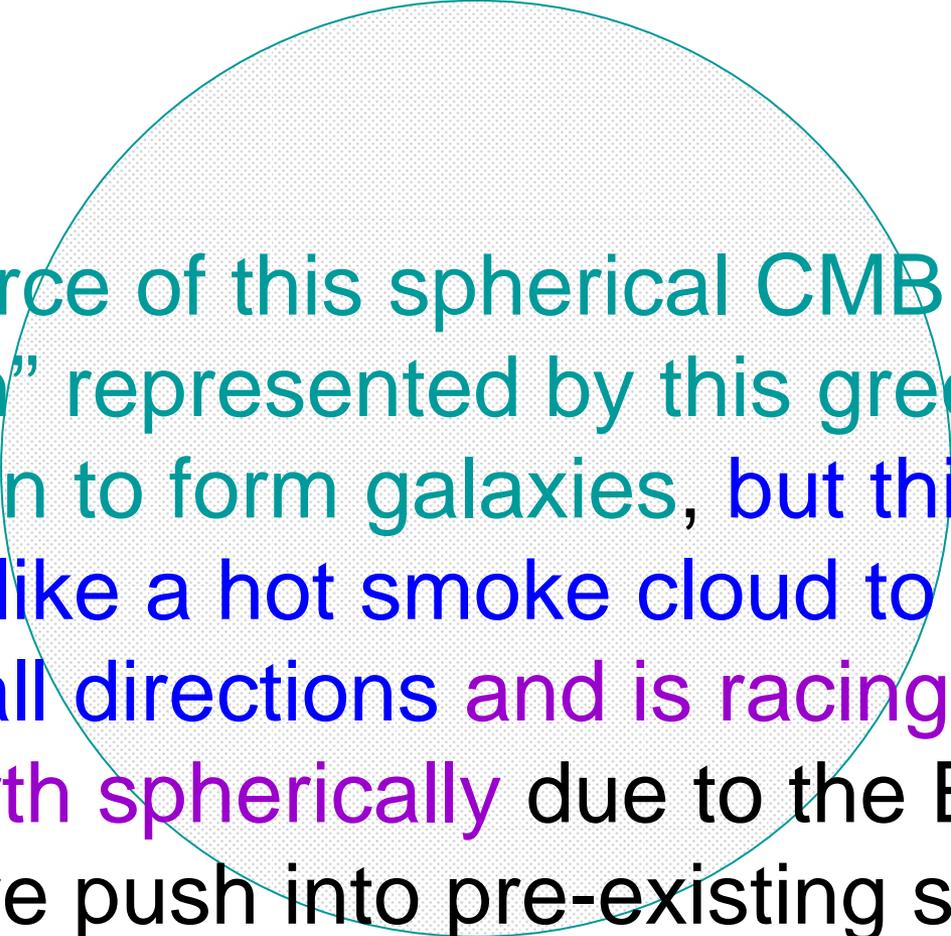




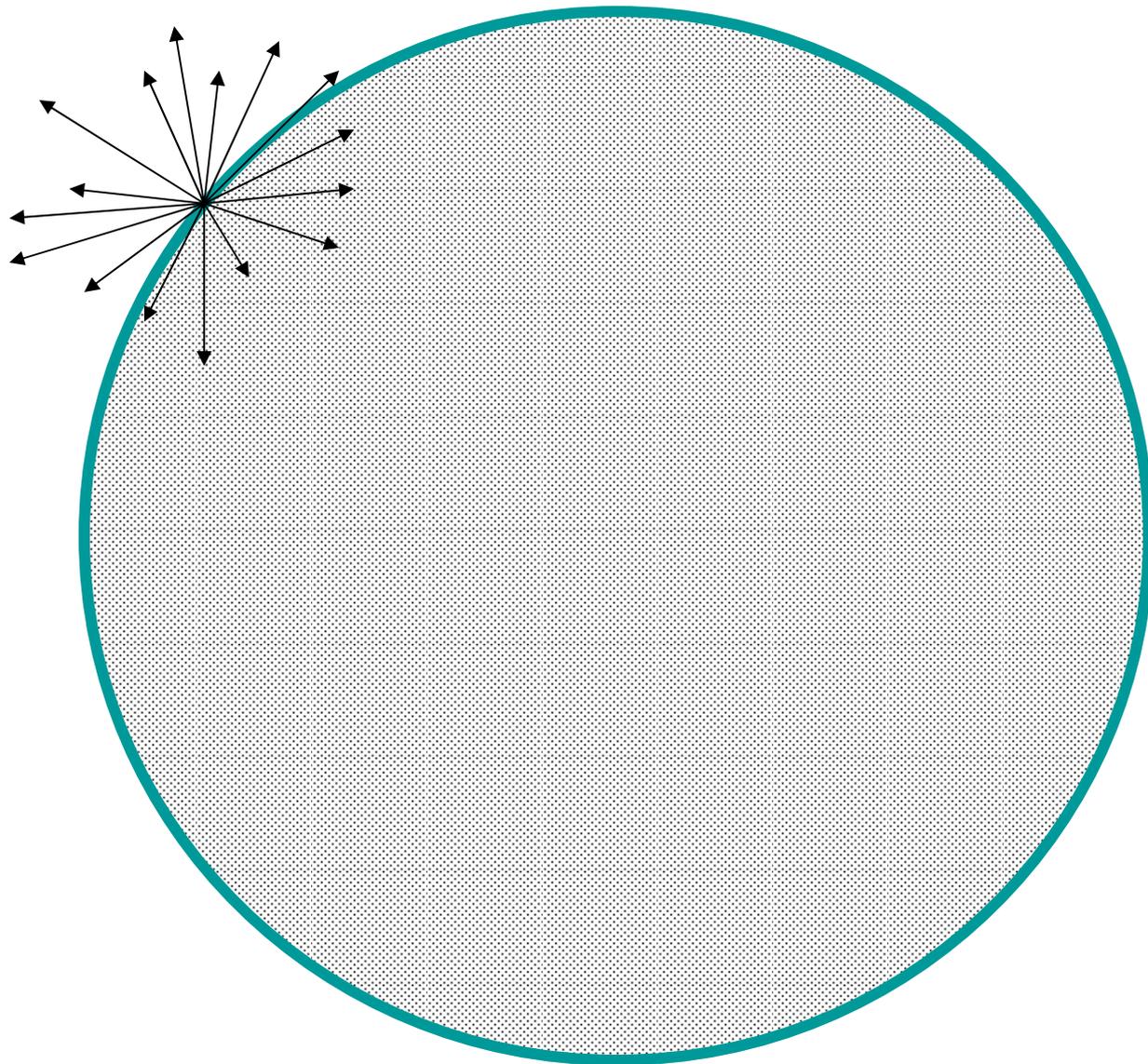


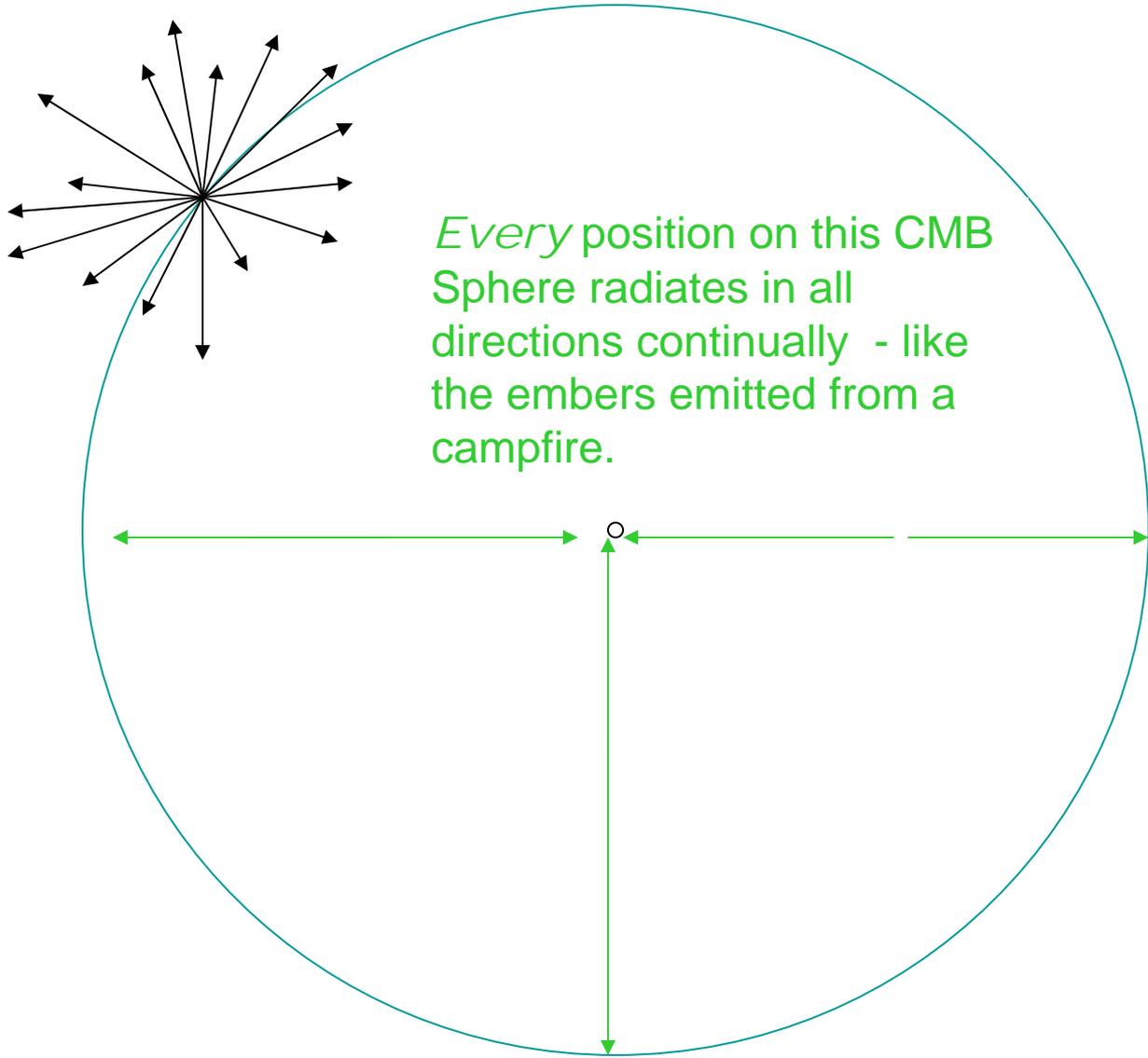




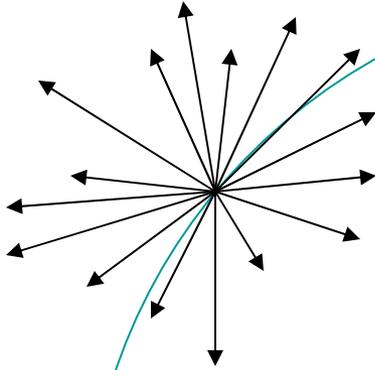


The source of this spherical CMB “ember radiation” represented by this green circle is too thin to form galaxies, but thick enough like a hot smoke cloud to radiate heat in all directions and is racing away from earth spherically due to the Big Bang Explosive push into pre-existing space.



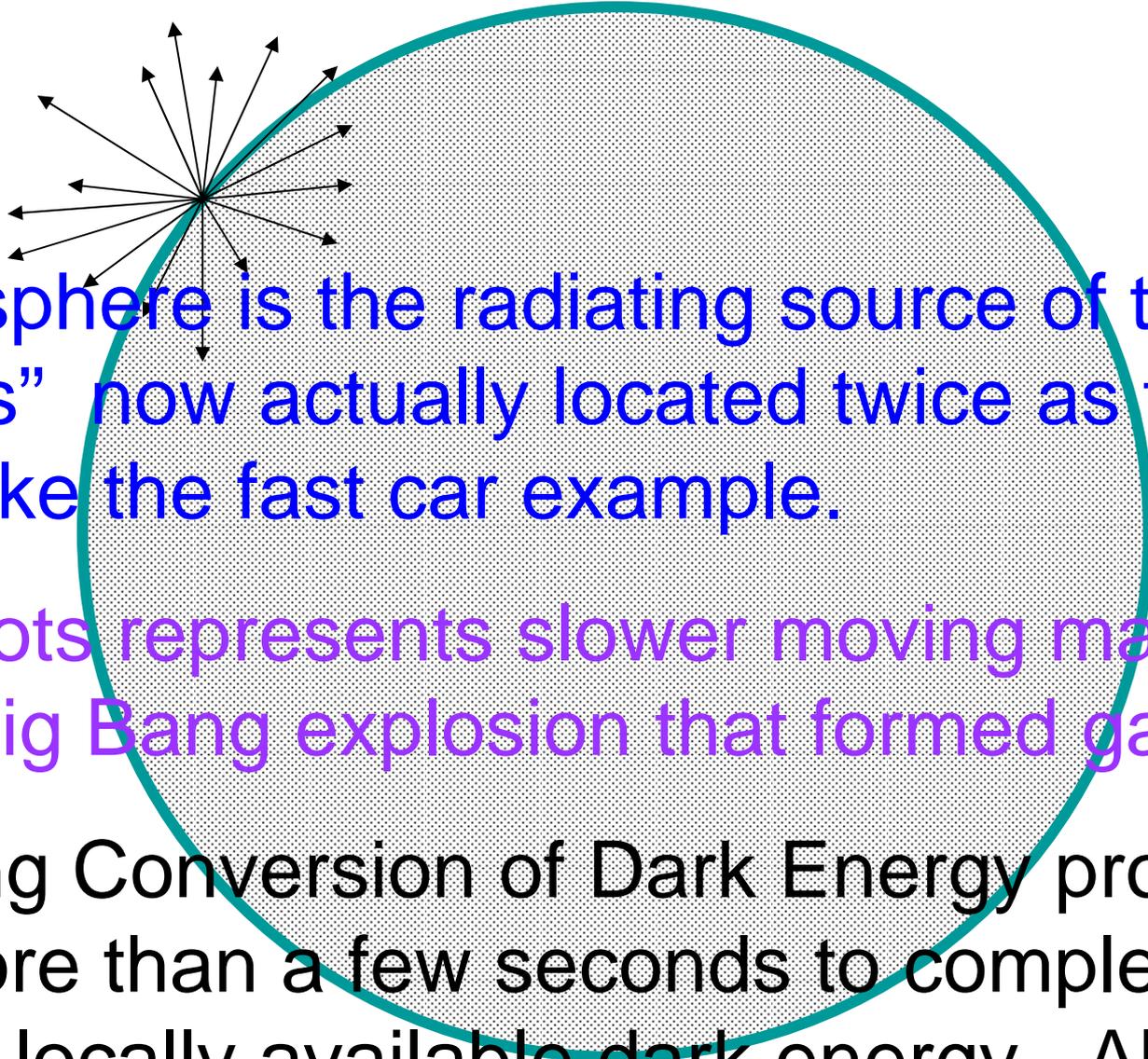


*Every position on this CMB Sphere radiates in all directions continually - like the embers emitted from a campfire.*



*Every position on this CMB Sphere radiates in all directions continually - like the embers emitted from a campfire.*

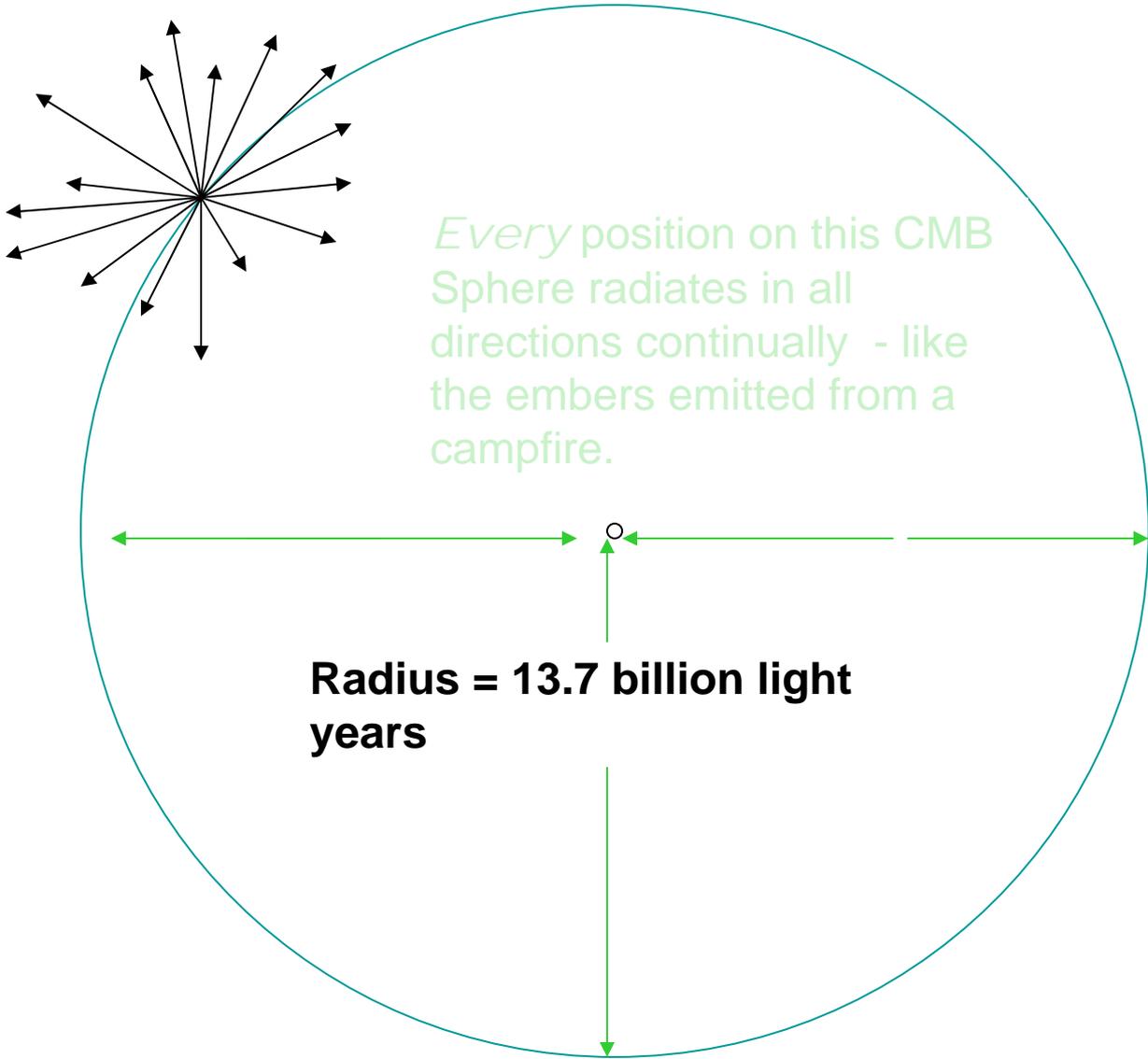




Green sphere is the radiating source of the CMB “embers” now actually located twice as far from Earth, like the fast car example.

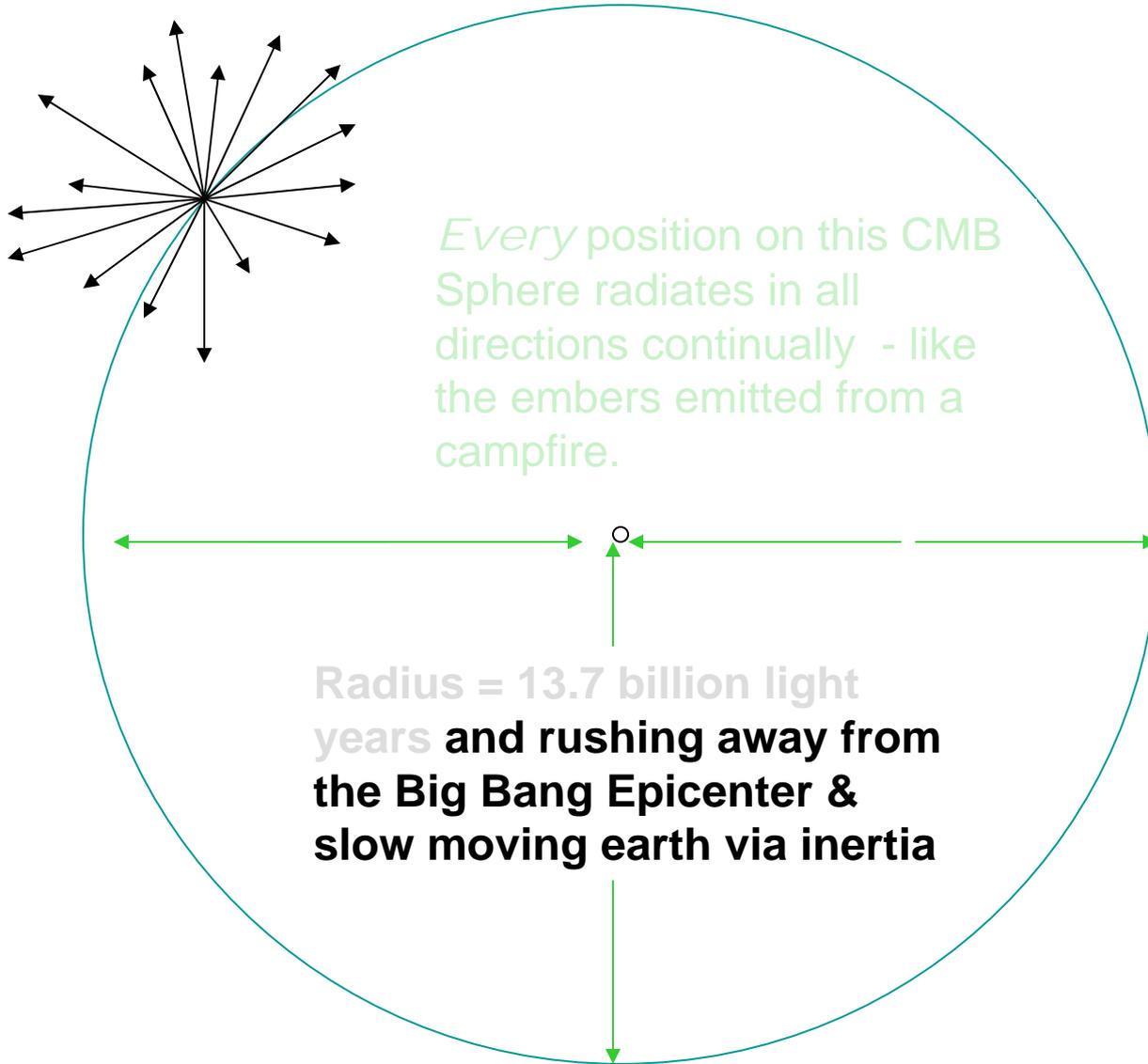
Black dots represents slower moving matter shot out of Big Bang explosion that formed galaxies.

Big Bang Conversion of Dark Energy probably took more than a few seconds to complete, burning locally available dark energy. All moving apart by inertia from explosive Big Bang push.



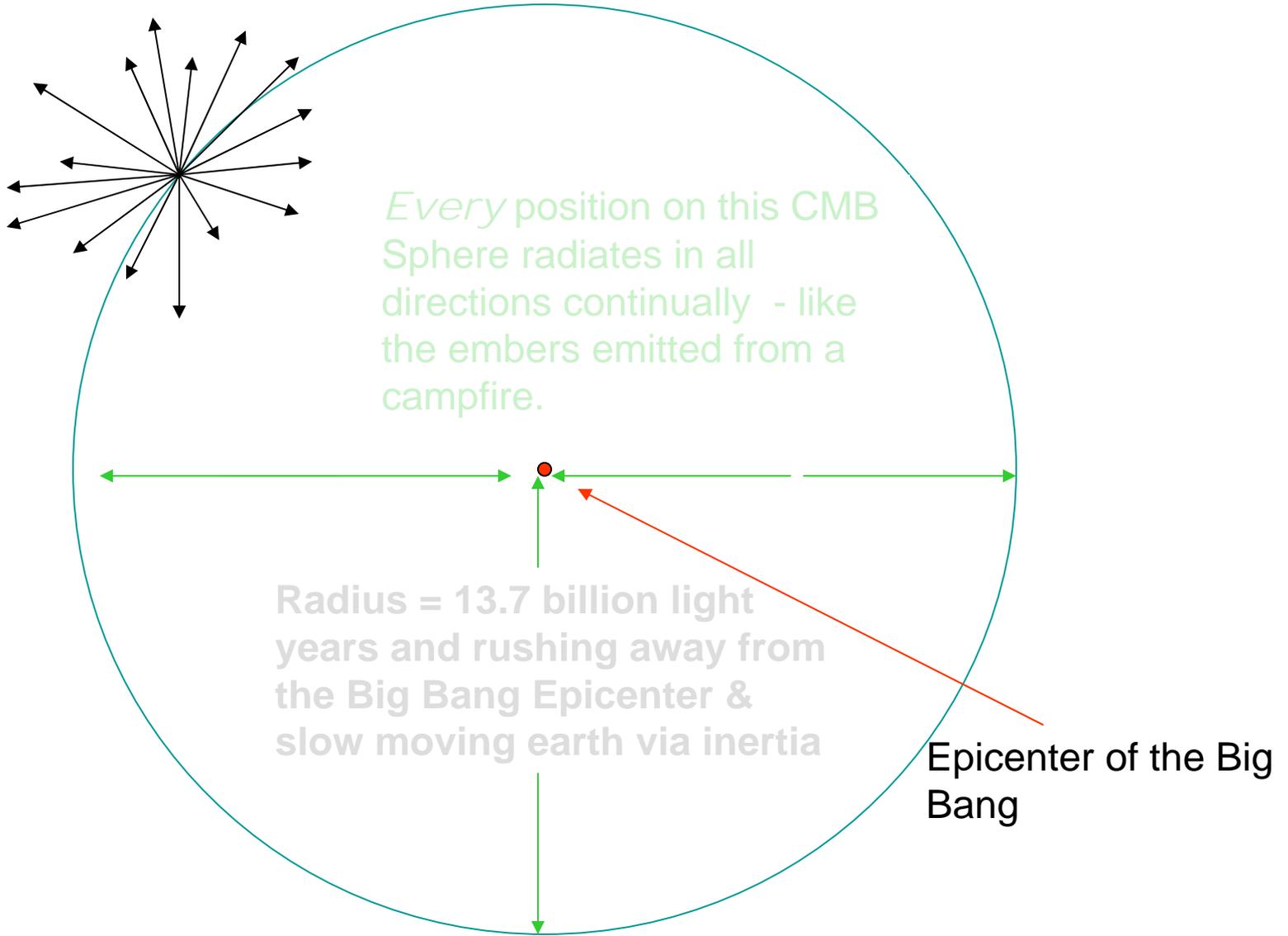
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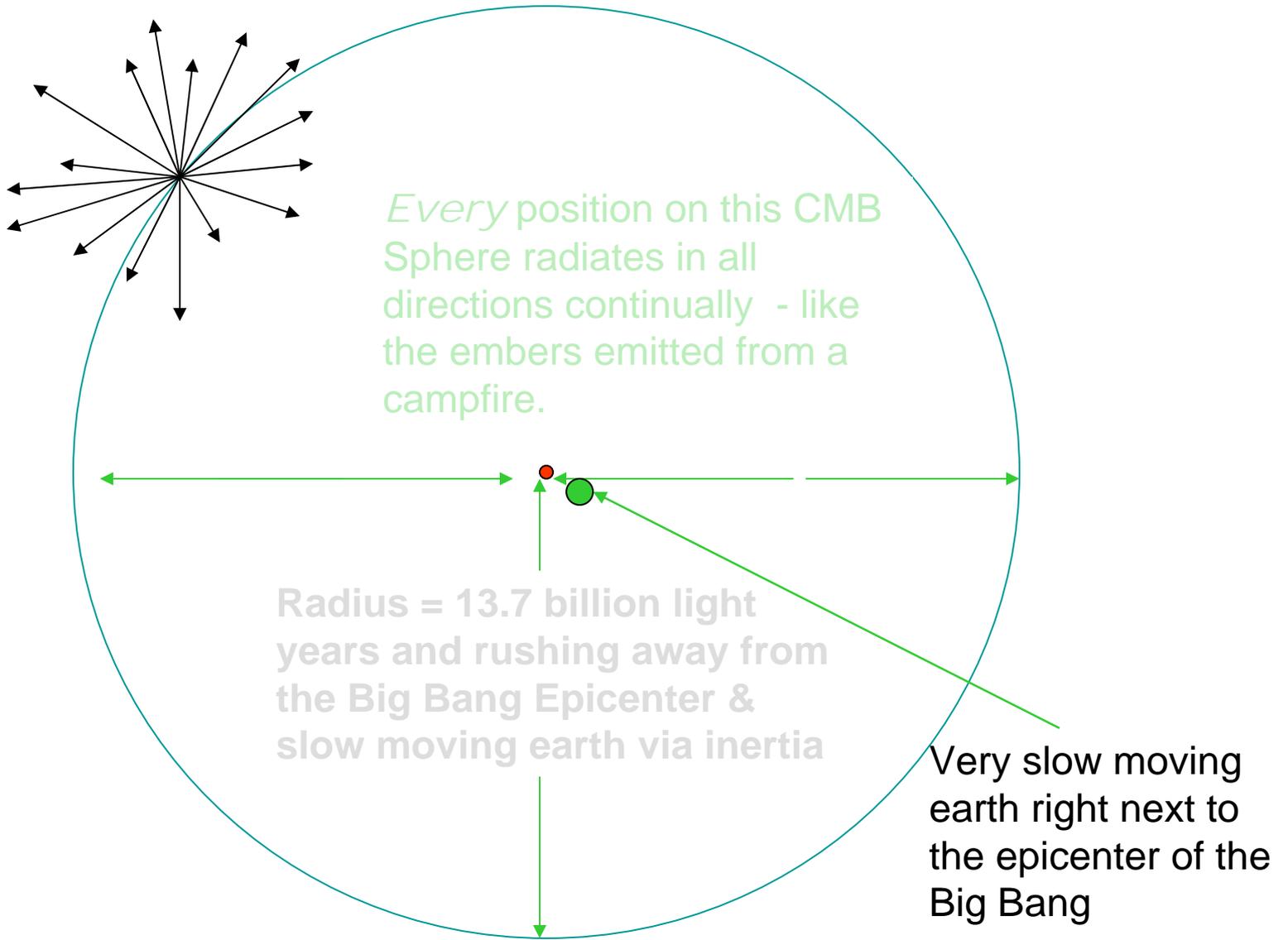
**Radius = 13.7 billion light years**



*Every position on this CMB Sphere radiates in all directions continually - like the embers emitted from a campfire.*

**Radius = 13.7 billion light years and rushing away from the Big Bang Epicenter & slow moving earth via inertia**

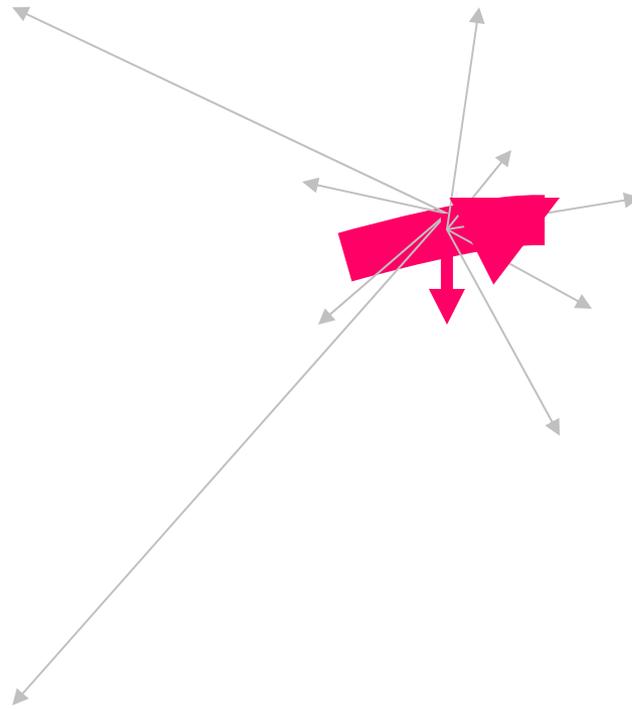




# Repeat slide 8 - What we sense

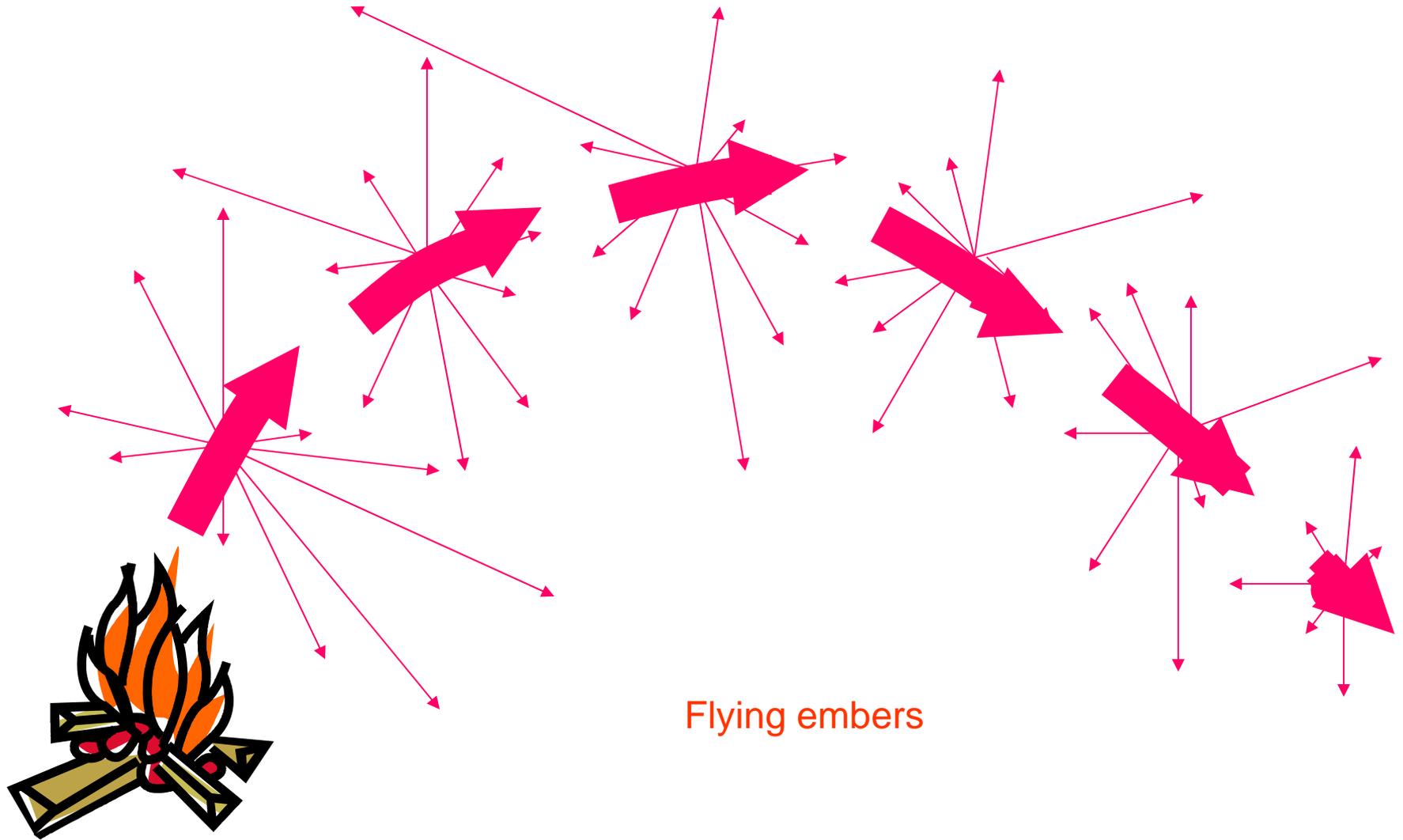
- While watching a campfire emit a flying ember one notes that it radiates in all directions as noted by the surrounding observing campers.
- However we only see the *facing* side of the current emission, *moment by moment*, directed at the viewer, not the whole path, same with the CMB as viewed by earth.

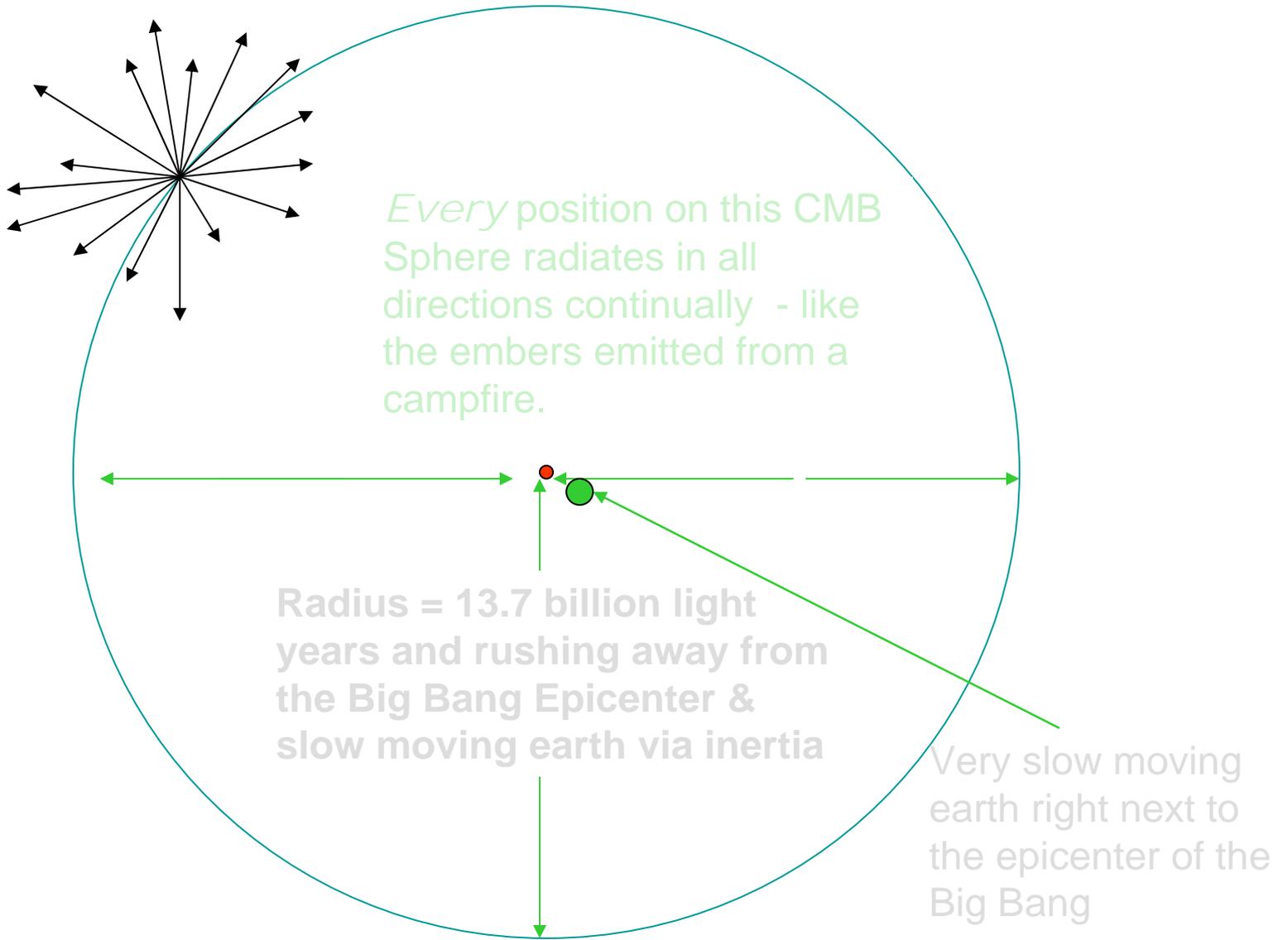
We can see only one of these rays at a time.

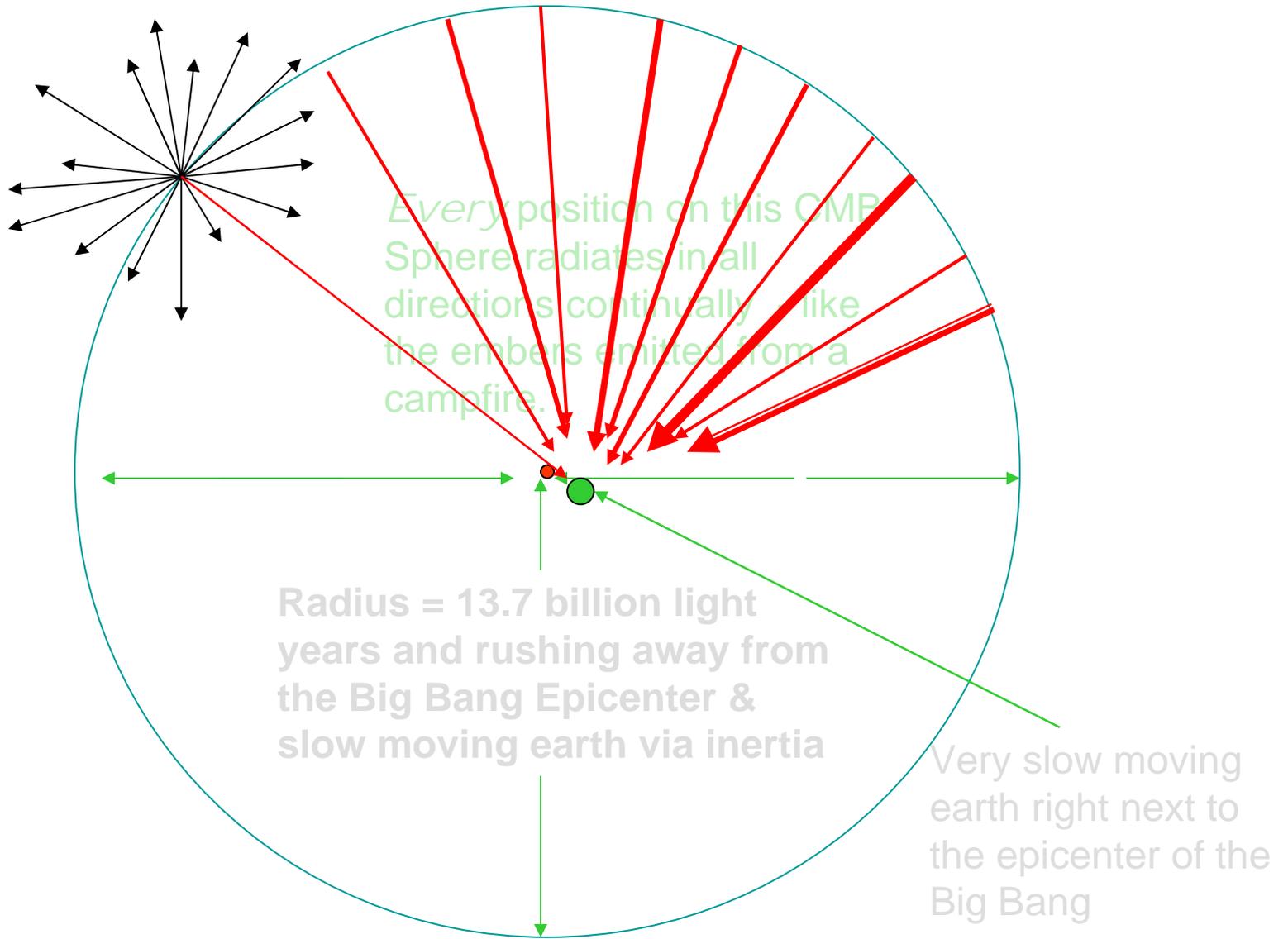


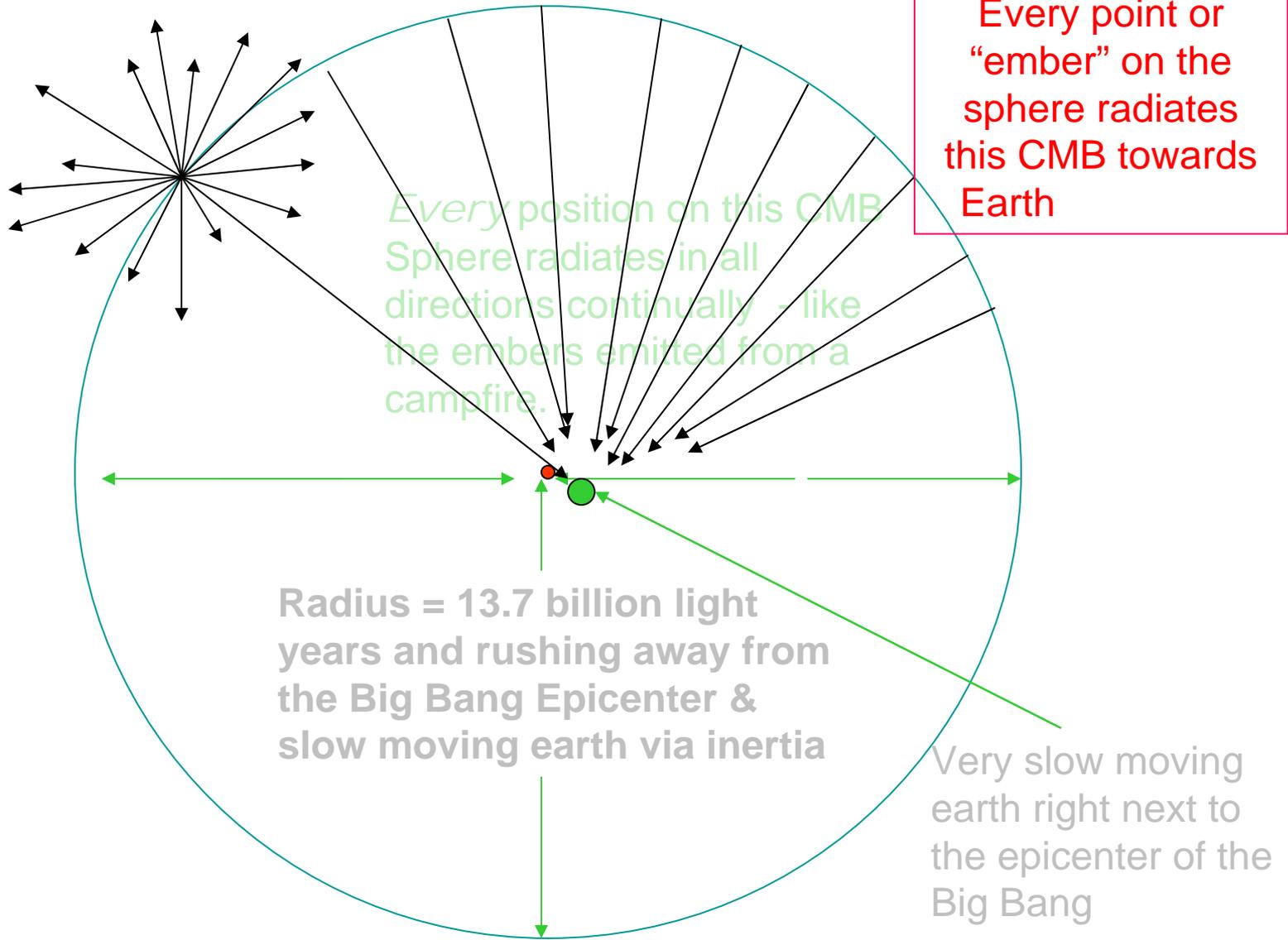
Flying embers

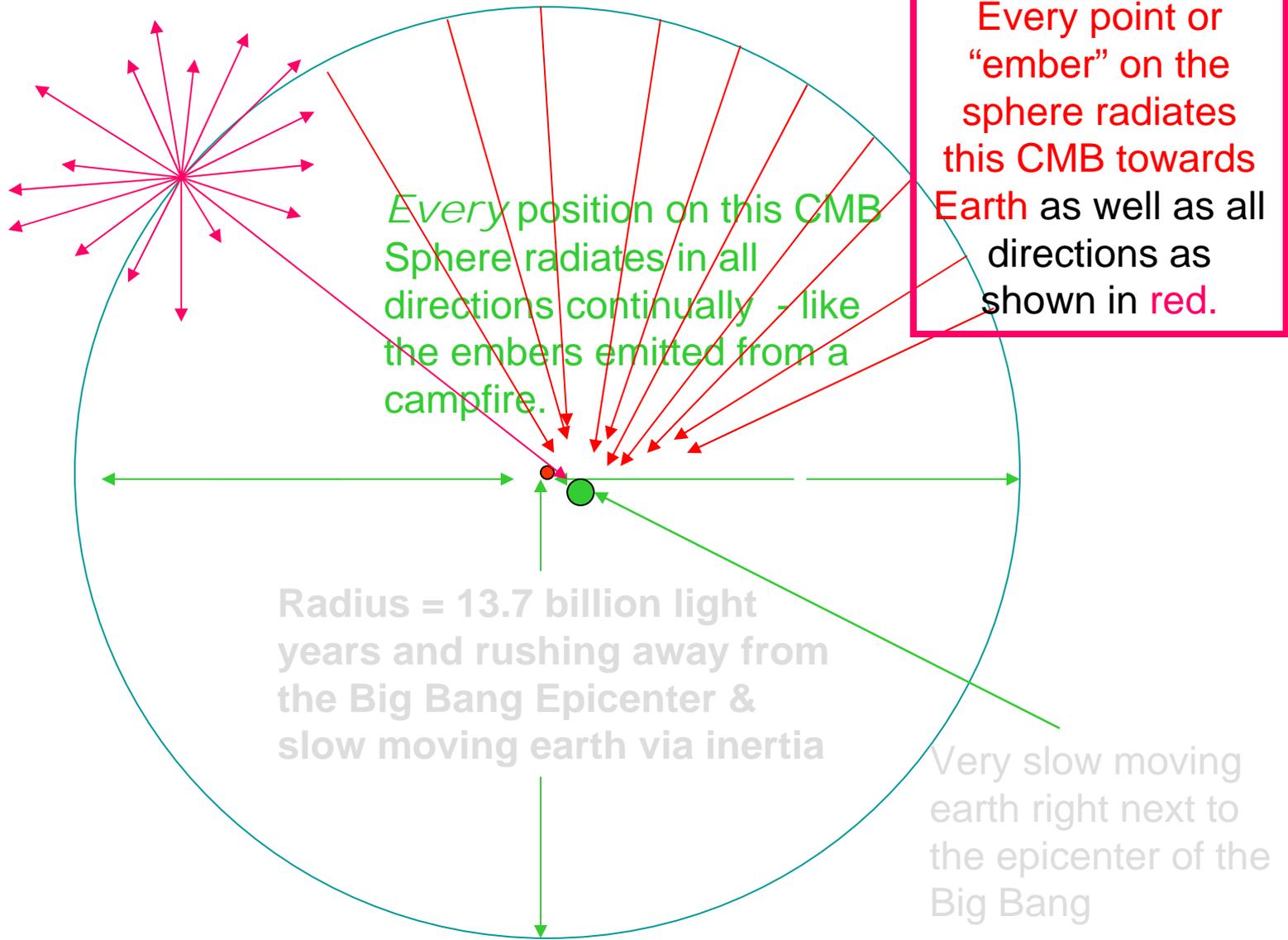
We cannot see all of these at once, nor all their directions, unless we could be everywhere in the universe.











Each point on the green sphere is like an “ember” that emanated from a *Big Bang* event – an explosion of *Dark Energy* found *in space* *converted* into *matter*

*Each ember started out hotter than our sun and after 14 billion years cooled to just above zero or 2.725K*

# Repeat of slide 7

- Page 74 – “Why – ... is the background radiation so uniformly distributed over the whole observable space?”
- NOTE: we on Earth cannot sense the “whole observable space” because we are on Earth.

*But we can measure the time when “ember” radiation reaches people at varying locations around the fire and apply that to our CMB physics.*

Now, today's CMB of 2.725 Kelvin in the past touched all celestial objects.

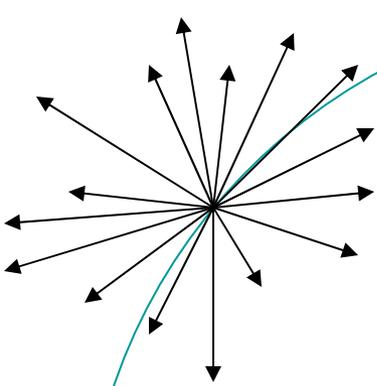
That radiation passed by, like a light flashing at a row of people lined up one behind another.

However

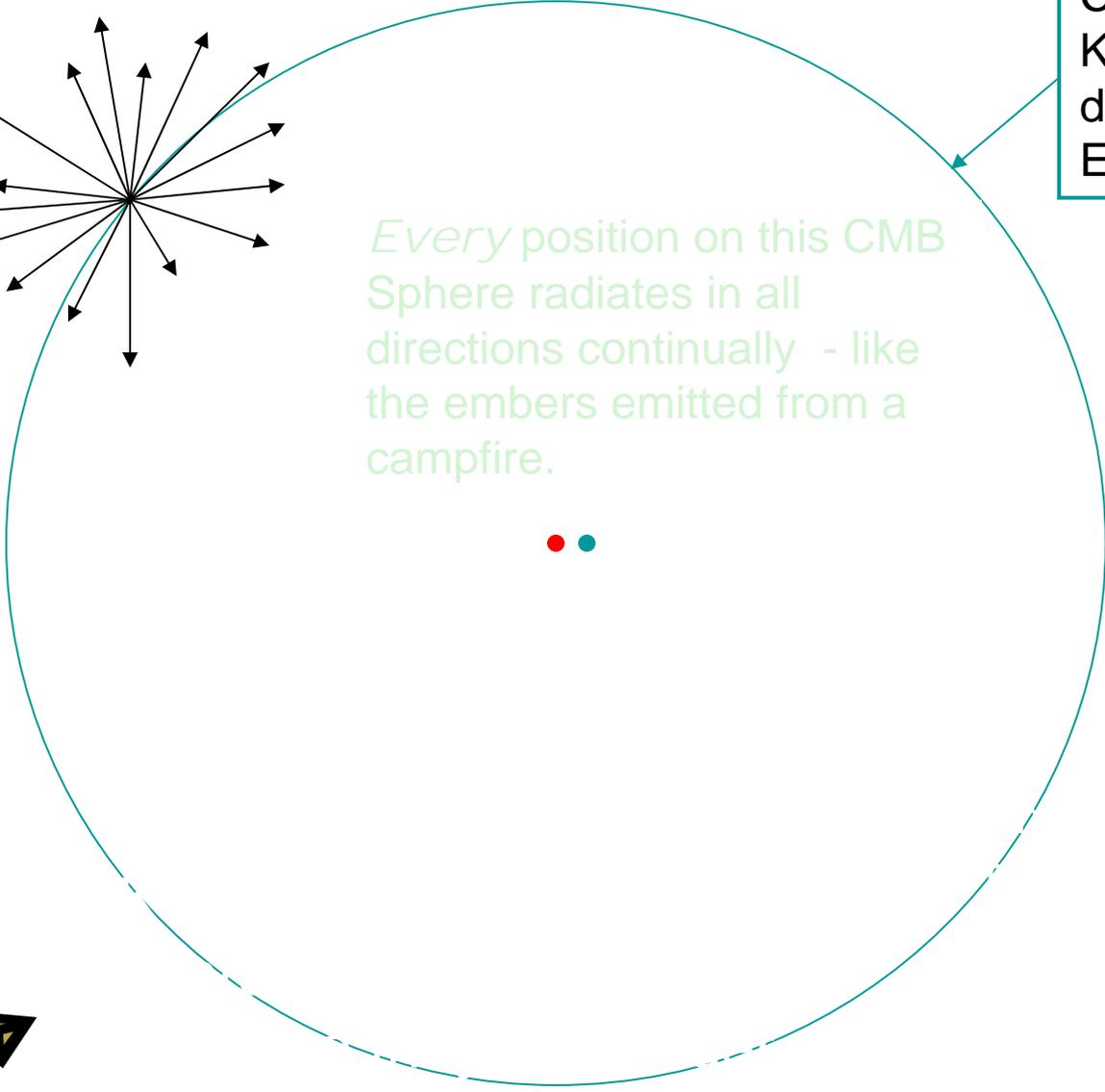
at this time celestial objects halfway across our universe will sense a colder reading of the CMB.

See next set of slides

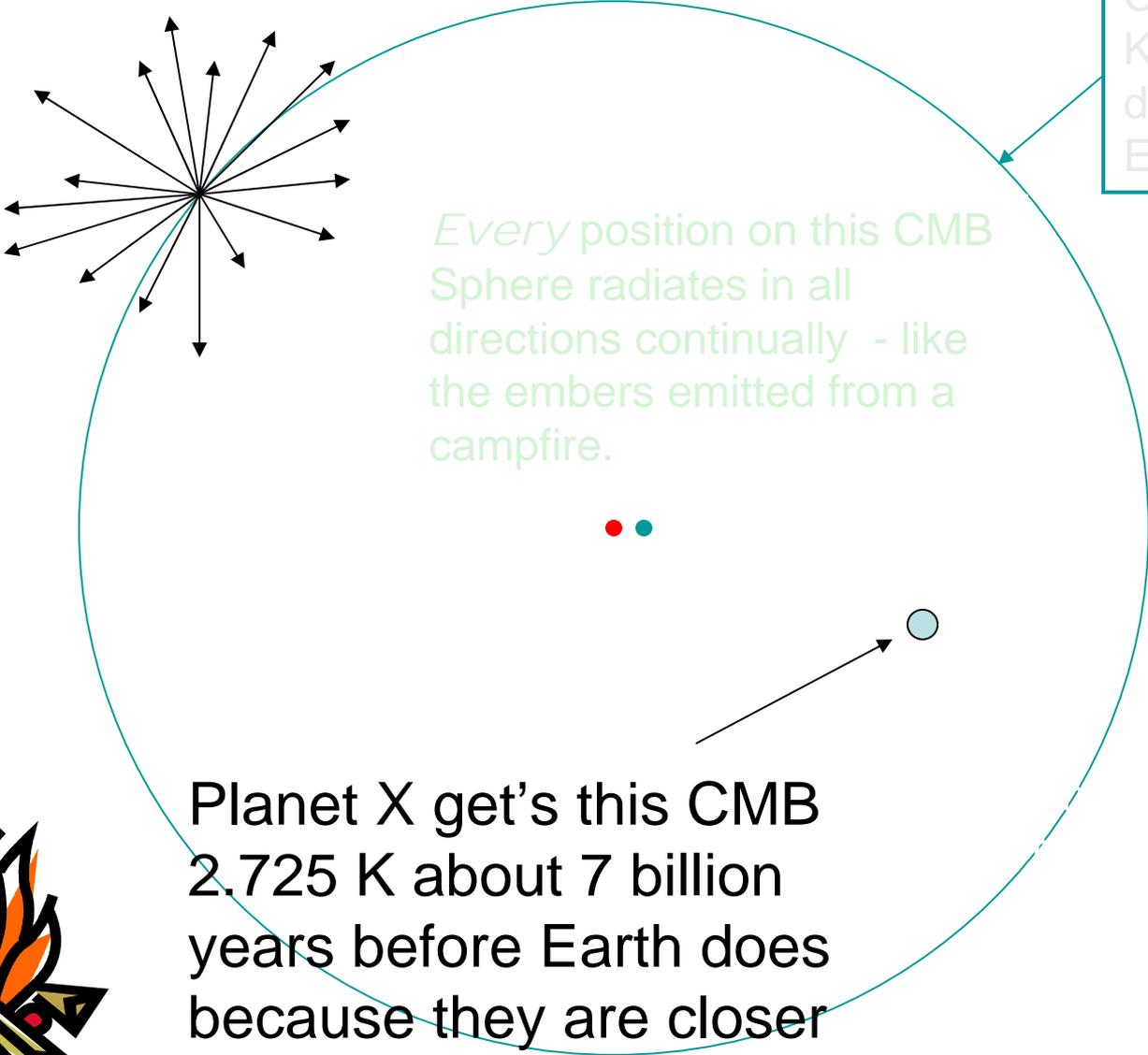
CMB was 2.725 Kelvin at this distance from Earth



*Every position on this CMB Sphere radiates in all directions continually - like the embers emitted from a campfire.*



CMB was 2.725 Kelvin at this distance from Earth

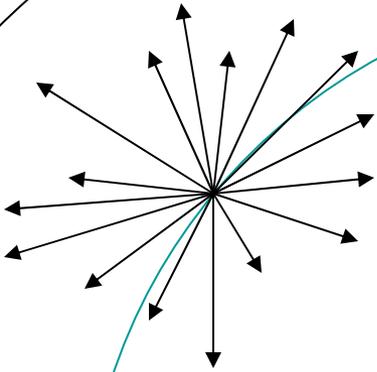


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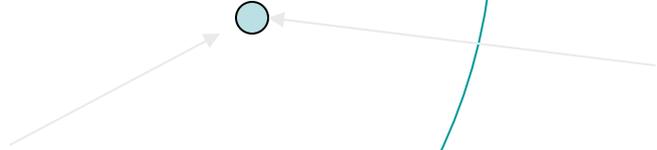
Planet X get's this CMB 2.725 K about 7 billion years before Earth does because they are closer to where that 2.725 kelvin was emitted.



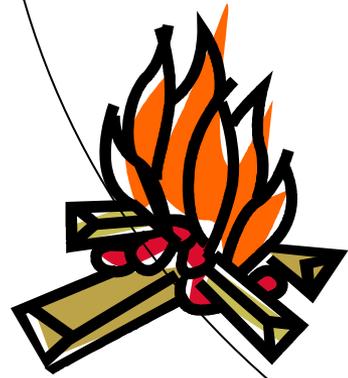
Actual  
CMB *is*  
now farther  
from Earth  
and colder



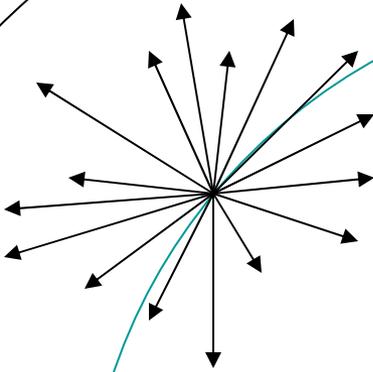
Every position on this CMB Sphere radiates in all directions continually - like the embers emitted from a campfire.



Planet X get's this 2.7 K CMB about 7 billion years before Earth does because they are closer to where that 2.7 kelvin was emitted.



Actual CMB *is* now farther from Earth and colder

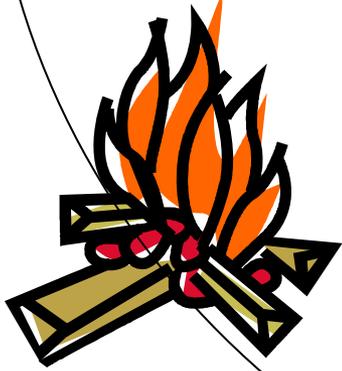


Every position on this CMB Sphere radiates in all directions continually - like the embers emitted from a campfire.

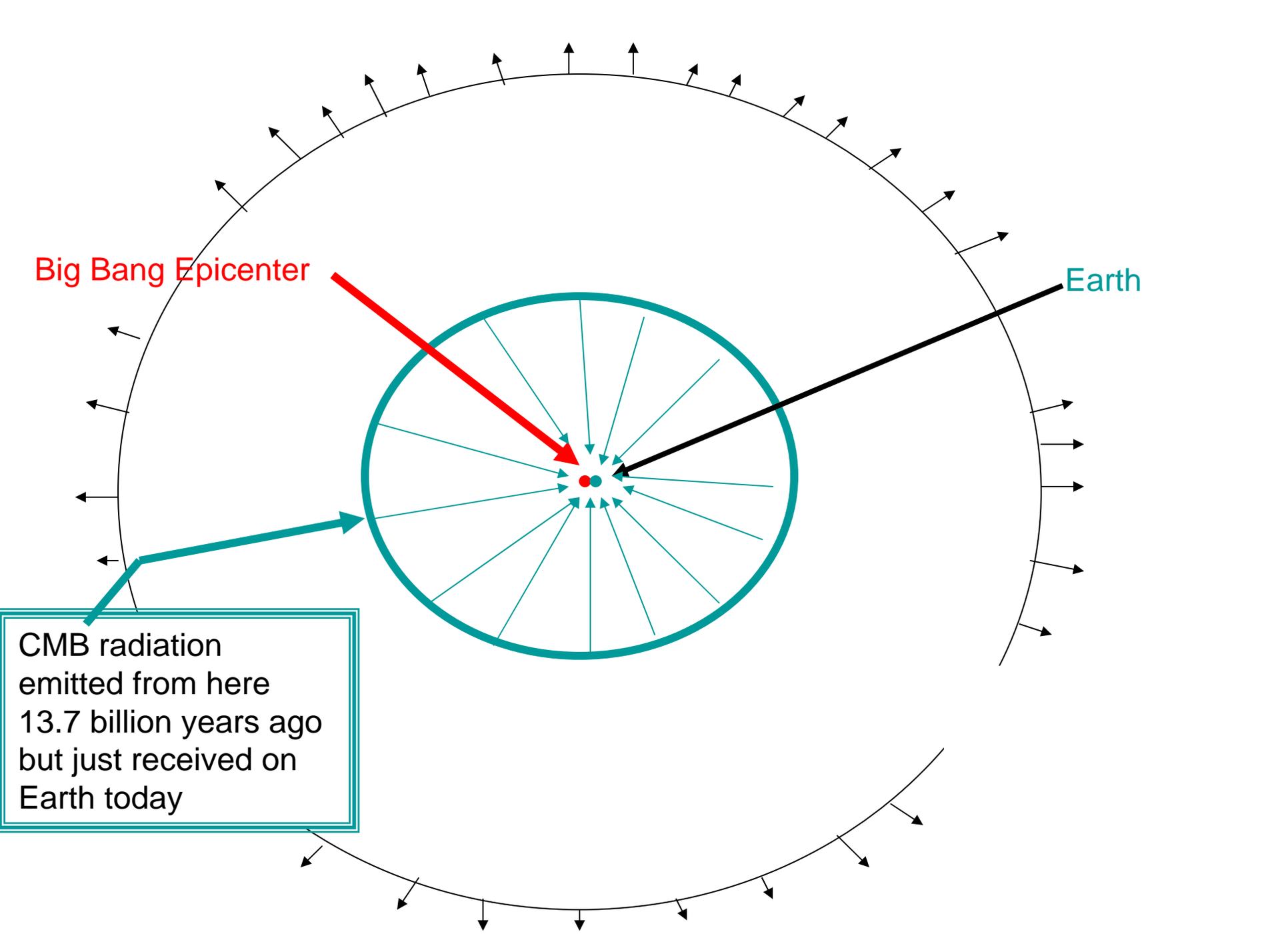


And today planet X reads the CMB from that source which is further from the Big Bang Epicenter and it is much colder. Fast car effect.

Planet X get's this 2.7 K CMB about 7 billion years before Earth does because they are closer to where that 2.7 kelvin was emitted.



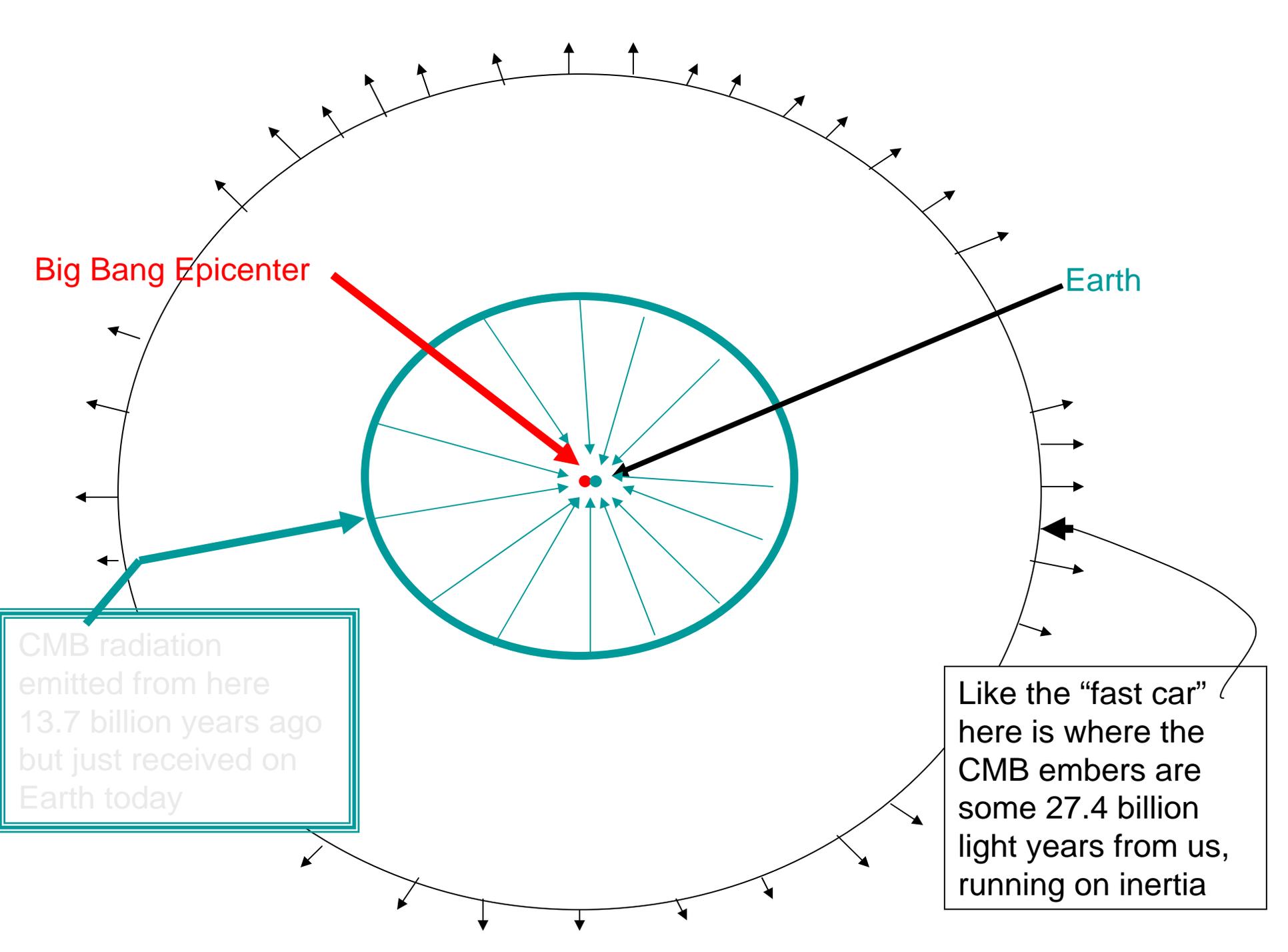
Remember the “fast car”



Big Bang Epicenter

Earth

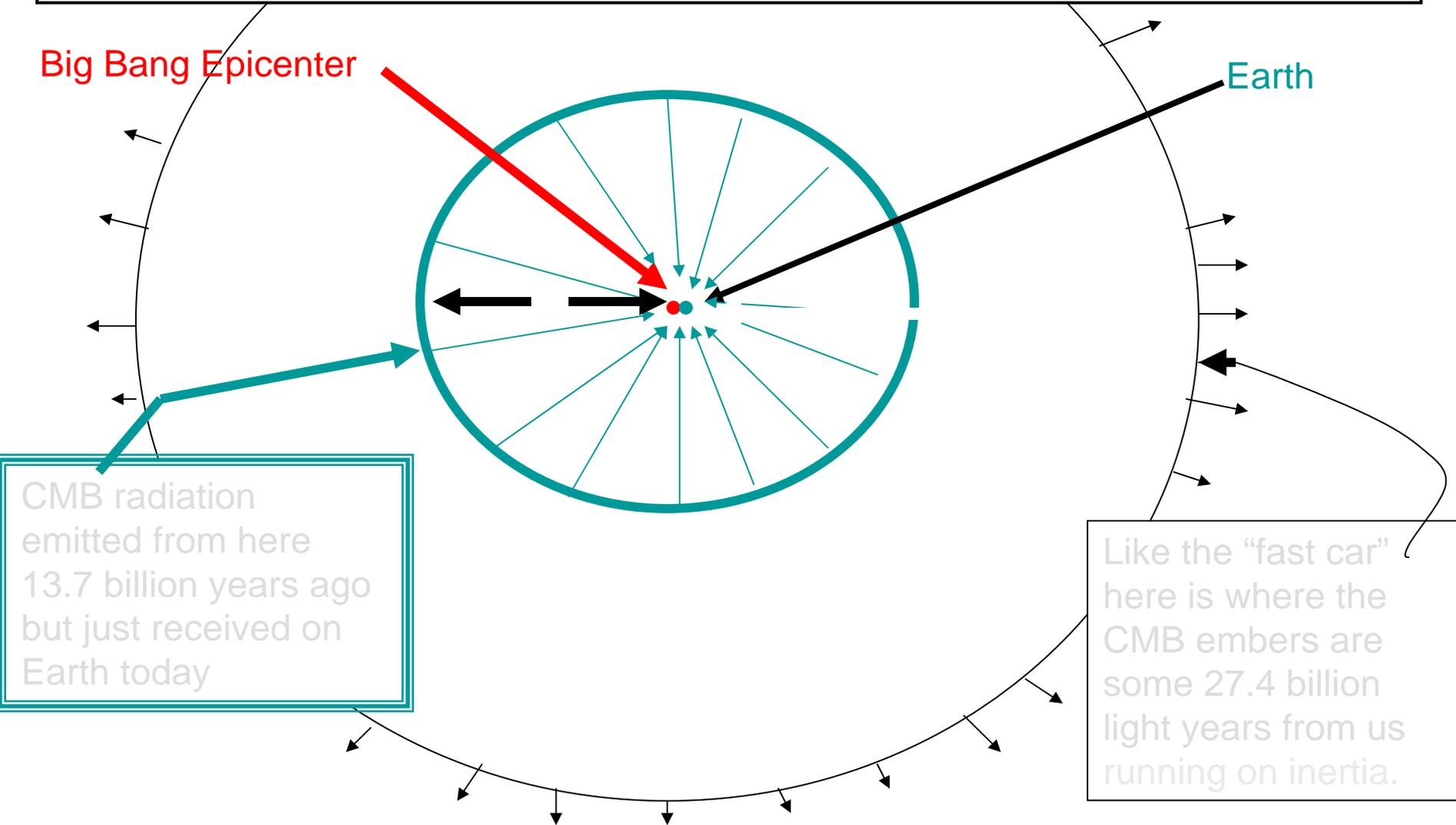
CMB radiation emitted from here 13.7 billion years ago but just received on Earth today



*Black radius = 13.7 billion light years*

Big Bang Epicenter

Earth



CMB radiation emitted from here 13.7 billion years ago but just received on Earth today

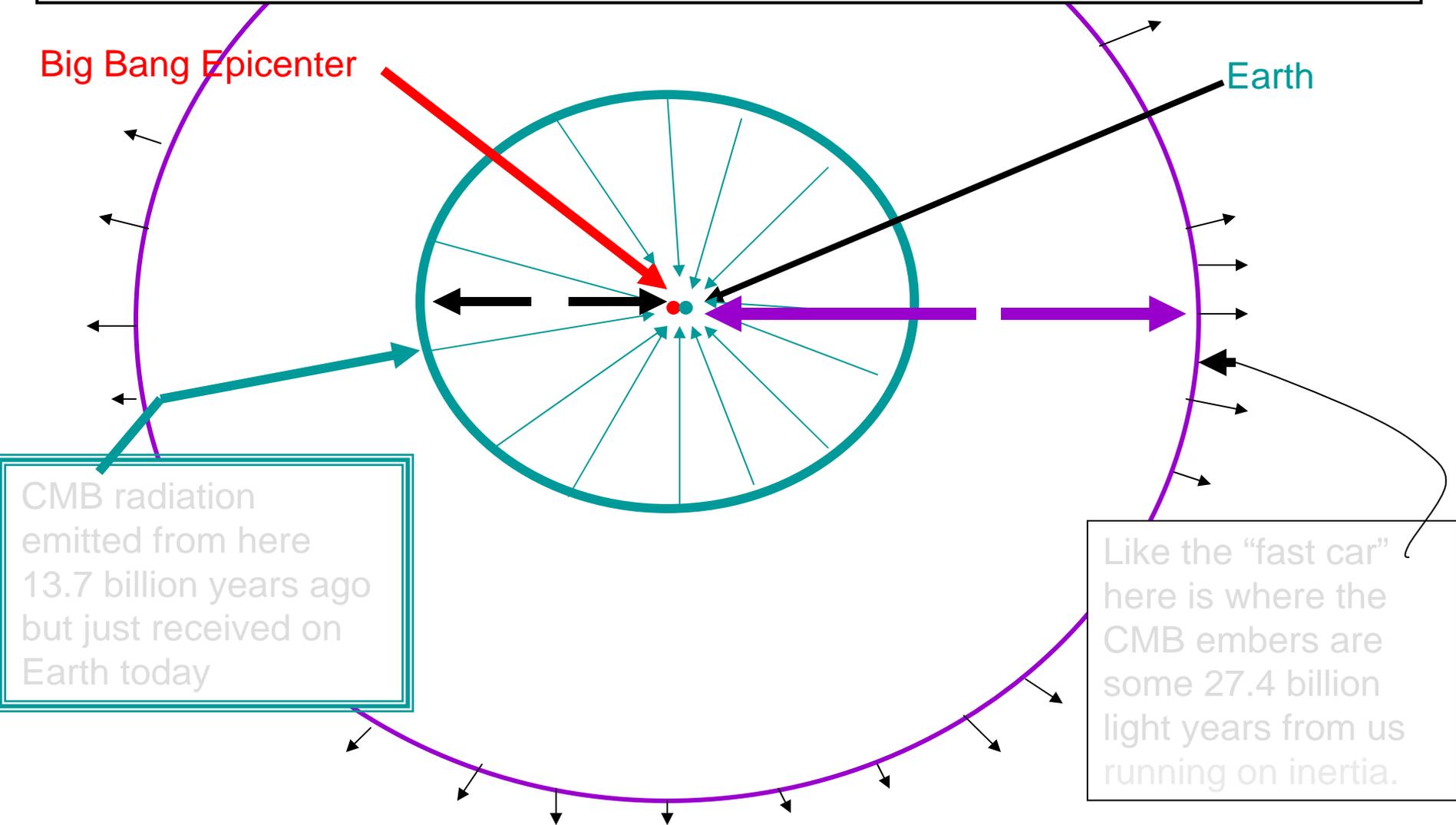
Like the "fast car" here is where the CMB embers are some 27.4 billion light years from us running on inertia.

*Black radius = 13.7 billion light years*

*Maroon radius = 27.4 or double 13.7*

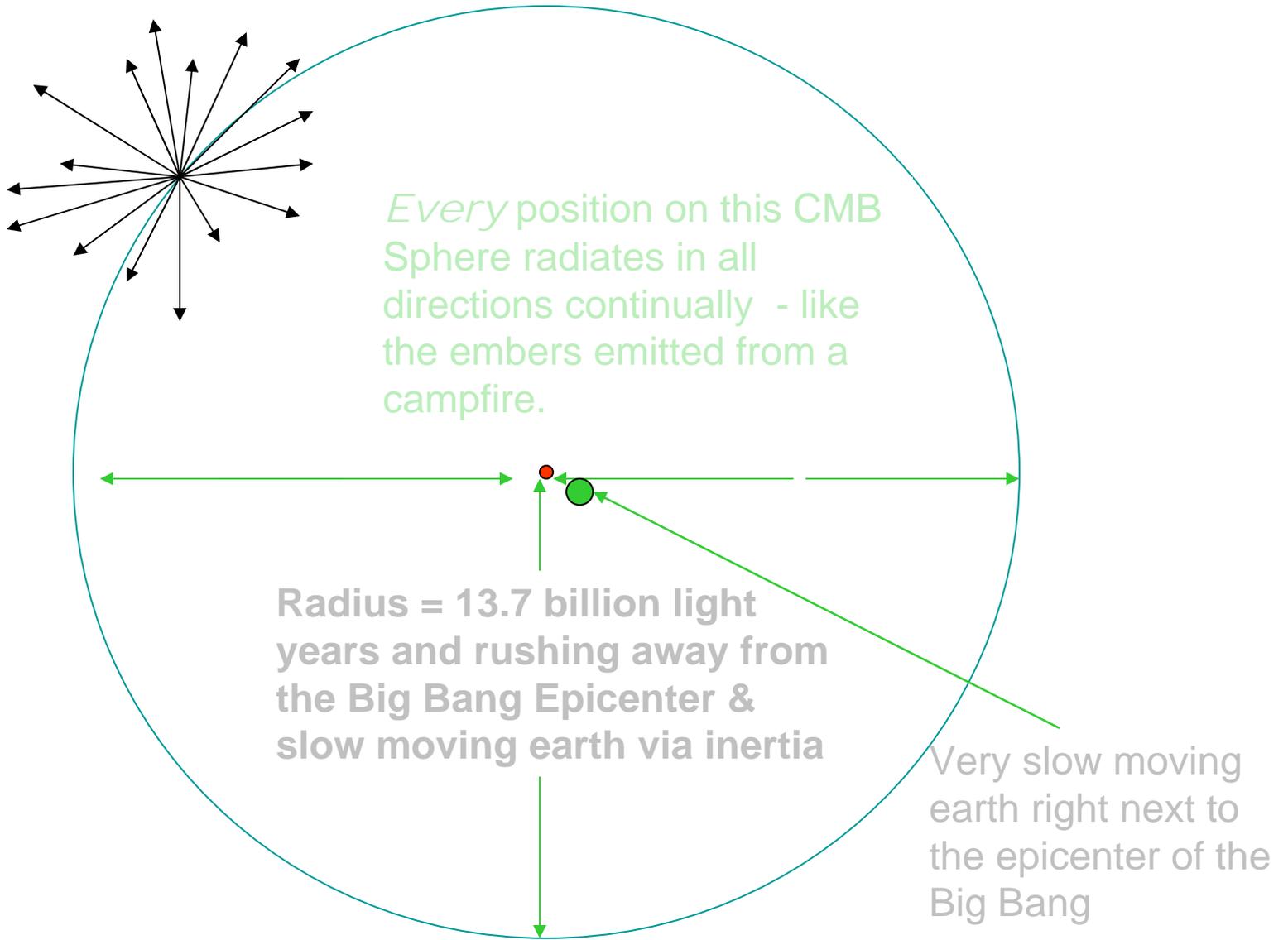
Big Bang Epicenter

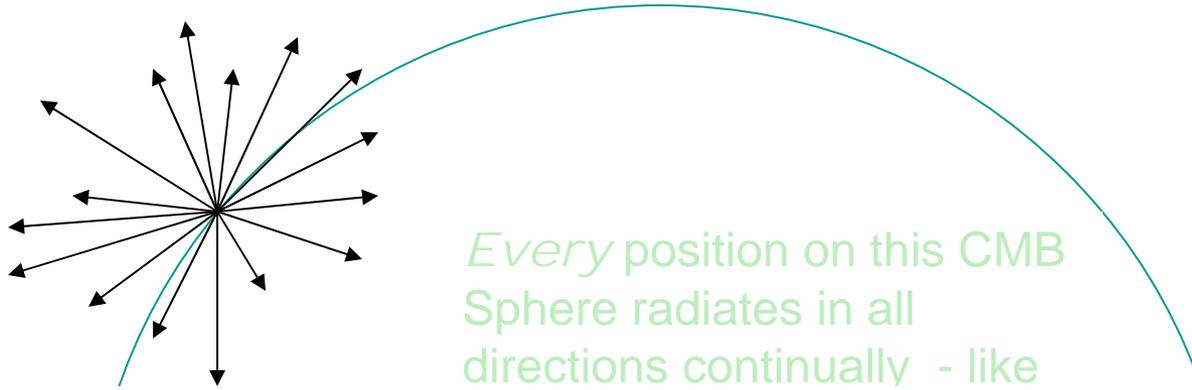
Earth



CMB radiation emitted from here 13.7 billion years ago but just received on Earth today

Like the "fast car" here is where the CMB embers are some 27.4 billion light years from us running on inertia.





Every position on this CMB  
Sphere radiates in all  
directions continually - like

*All the above describes*

# *the Physics of the CMB*

years and rushing away from  
the Big Bang Epicenter &  
slow moving earth via inertia

Very slow moving  
earth right next to  
the epicenter of the  
Big Bang

Further observations that support this description of the CMB that surrounds *very slow moving* Earth are found by studying

the two NASA Deep Field Surveys

and the Anglo/Australian study of Quasars both depicted next.

Further observations that support this description of the CMB that surrounds *very slow moving* Earth are found by studying

the two NASA Deep Field Surveys

and the Anglo/Australian study of Quasars both depicted next.

NASA's Hubble Ultra deep field north *HUDF09* & south *HDF-S* studies

Distance across *HUDF09* to *HDF-S* is approximately 25 Gly

13 Gly *HUDF09*  
12/8/09

*Galaxies in North field HUDF09*

Gly = billion light years

*Very slow moving Earth* 600 k/s or 0.2% speed of light - about 60 million light years from center

*Center of our Universe - EBB*

The only possible explanation for our unique view of Hubble's deep fields and galaxy filled space requires that this is seen from a *very slow moving earth* located right next to the epicenter [*EBB*] of the Big Bang Explosion IN SPACE that was powered by *Dark Energy*.

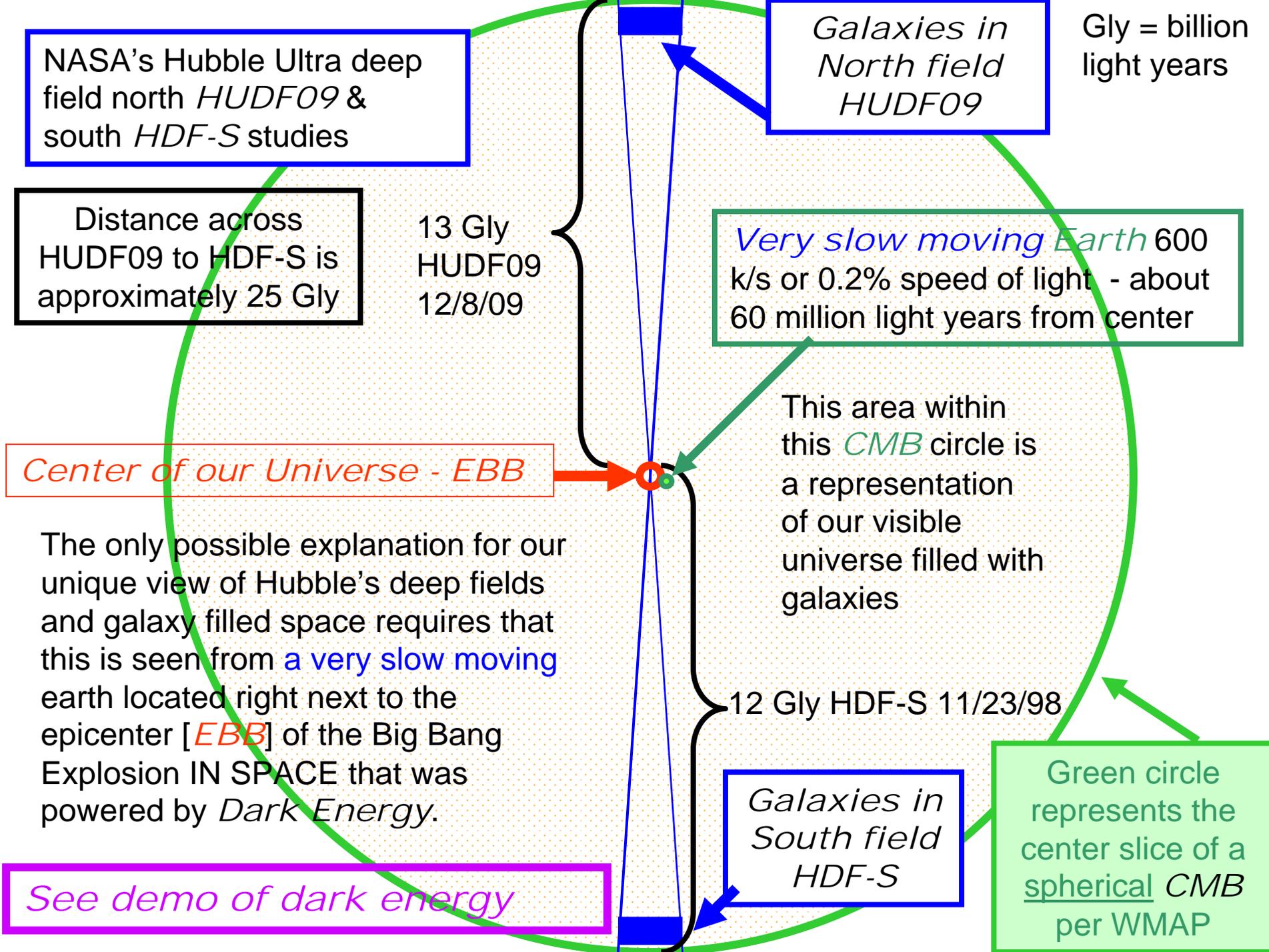
This area within this *CMB* circle is a representation of our visible universe filled with galaxies

12 Gly *HDF-S* 11/23/98

*Galaxies in South field HDF-S*

Green circle represents the center slice of a spherical CMB per WMAP

*See demo of dark energy*



<http://hubblesite.org/newscenter/archive/releases/1996/01/text/> - about HDF

“Though the field [HDF] is a very small sample of the heavens, it is considered representative of the typical distribution of galaxies in space because the universe, statistically, looks largely the same in all directions.”

<http://hubblesite.org/newscenter/archive/releases/1998/41/text/> re: HDF-S

“The two deep fields now give astronomers two "core samples" of the universe for better understanding the history of the cosmos.”

*“[this] pair of observations can ... confidently infer the state of the cosmos as a whole.”*

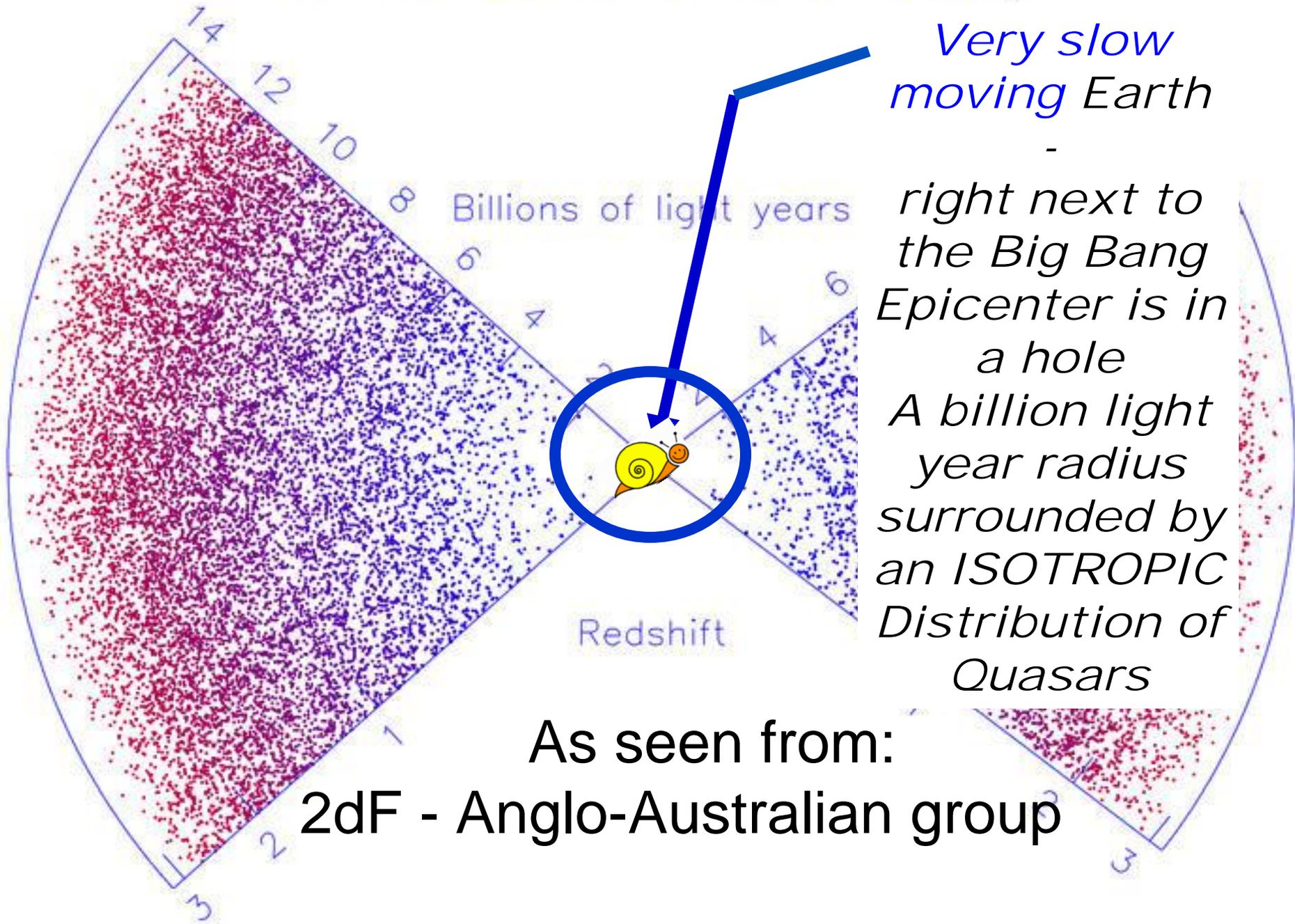
# For more info on Deep Field

- See:
  - Copernican Principle  
Demolished by NASA's WMAP & Hubble  
*Deep Field Observations* – Center of  
Universe Located April 16, 2010
- <http://www.allnewuniverse.com/CopernicanPrincipleDemolishedApril2010.pdf>

# Last major support

- Shown next is the 2dF Quasar red shift survey
- providing Earth's unique **central** view of the most powerful celestial objects seen, quasars.
- It is called a pie chart because we only see above and below the Milky Way Plane which obscures the total view.

# The 2dF Quasar Redshift Survey



This CMB analysis, the Deep Field studies and the 2dF Quasar pie chart all provide the isotropic view from a very slow moving Earth's location right next to the epicenter of the Big Bang tying the *Physics of the CMB* to the Universe.

Current “scientific”  
understanding of our Universe  
as reported in major publications

Chicago Tribune – article collections --  
February 21, 2003 Editorial page titled:  
**The end of the universe, cont'd**

"We know much and understand little,"  
says University of Chicago cosmologist  
Michael Turner.

Quotes From Article: Probing the Biggest Mystery in the Universe

“We have a complete inventory of the universe,” Sean Carroll, a California Institute of Technology cosmologist, has said, “*and it makes no sense.*”

**“Dark Energy: The Biggest Mystery in the Universe**  
Michael Turner coined the term "dark energy" in 1998.”  
“*No one knows what it is.*”

“But even Einstein recognized that his theory of *general relativity didn't entirely explain the universe*. He spent the last 30 years of his life trying to reconcile his physics of the very big with the physics of the very small—quantum mechanics.” - *See Sven's Demo of dark energy for a proper reconcillation.*

Sven says that the Universe is very  
easy to understand; see:

Demo of Dark Energy

by Charles Sven

11/11/2009

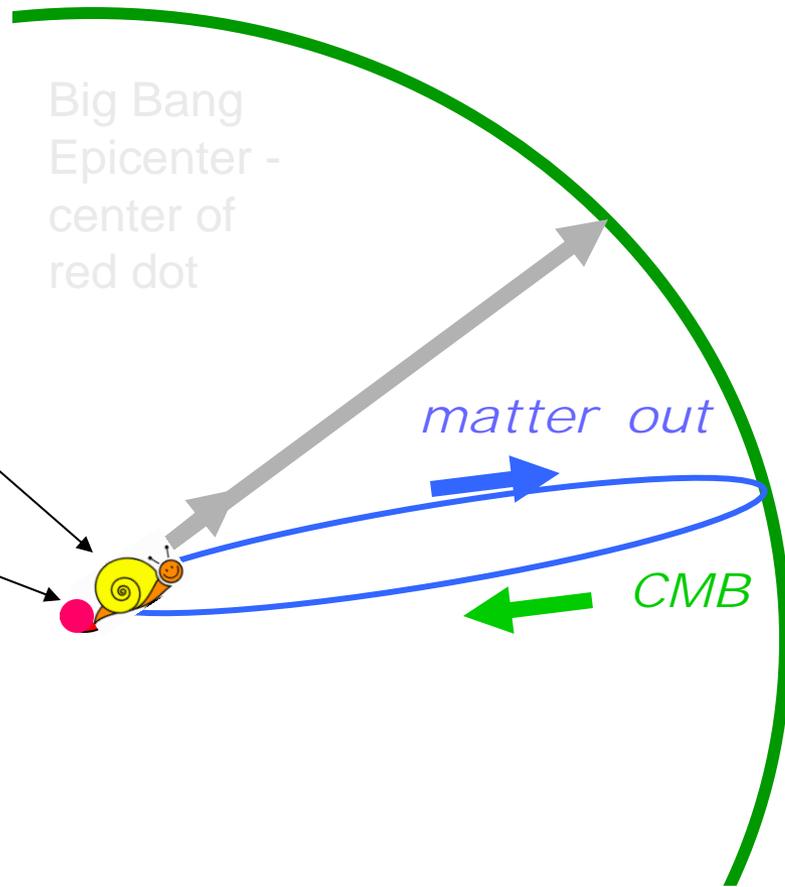
at:

[http://www.allnewuniverse.com/  
DemoOfDarkEnergy.pdf](http://www.allnewuniverse.com/DemoOfDarkEnergy.pdf)

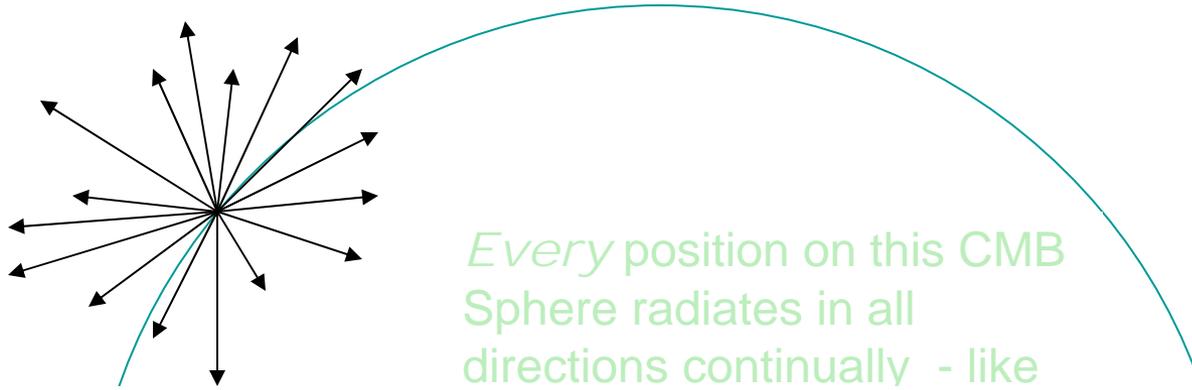
# The shape of the Universe - an exploding, galaxy filled sphere, rushing out into preexisting space

- Began via conversion of Dark Energy found in space - demo by Stanford Labs  
<http://www.allnewuniverse.com/DemoOfDarkEnergy.pdf>
- Observational support
  - Physics of the CMB
  - NASA deep field studies
  - 2dF Quasar red shift survey pie chart

*Very slow  
Earth is  
next door to  
the Center  
of our  
Universe*



*This CMB "ember" view requires a fast car analysis*  
*13.7+ billion light years from Big Bang "embers" out*  
*13.7 billion year radiation emitted return to Earth =*  
*27.4+ billion year old view = Age of Universe*



Every position on this CMB  
Sphere radiates in all  
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*All the above describes the*

# *Physics of the Universe*

years and rushing away from  
the Big Bang Epicenter &  
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Very slow moving  
earth right next to  
the epicenter of the  
Big Bang

# This Presentation

Continues my studies as presented at  
American Physical Society - Spring  
2009 in Denver

1<sup>st</sup> presented at U. of Notre Dame –  
Midwest Relativity Meeting 2008  
Chairman Grant Mathews presiding

who suggested that I develop the Math  
that led to today's work