The cosmic web and microwave background fossilize the first turbulent combustion

Carl H. Gibson, Professor, MAE and SIO, University of California at San Diego, La Jolla, CA 92093-0411, USA

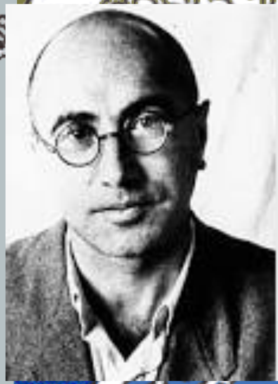
R. Norris Keeler, Consultant, Arlington, VA, USA

Journalofcosmology.com

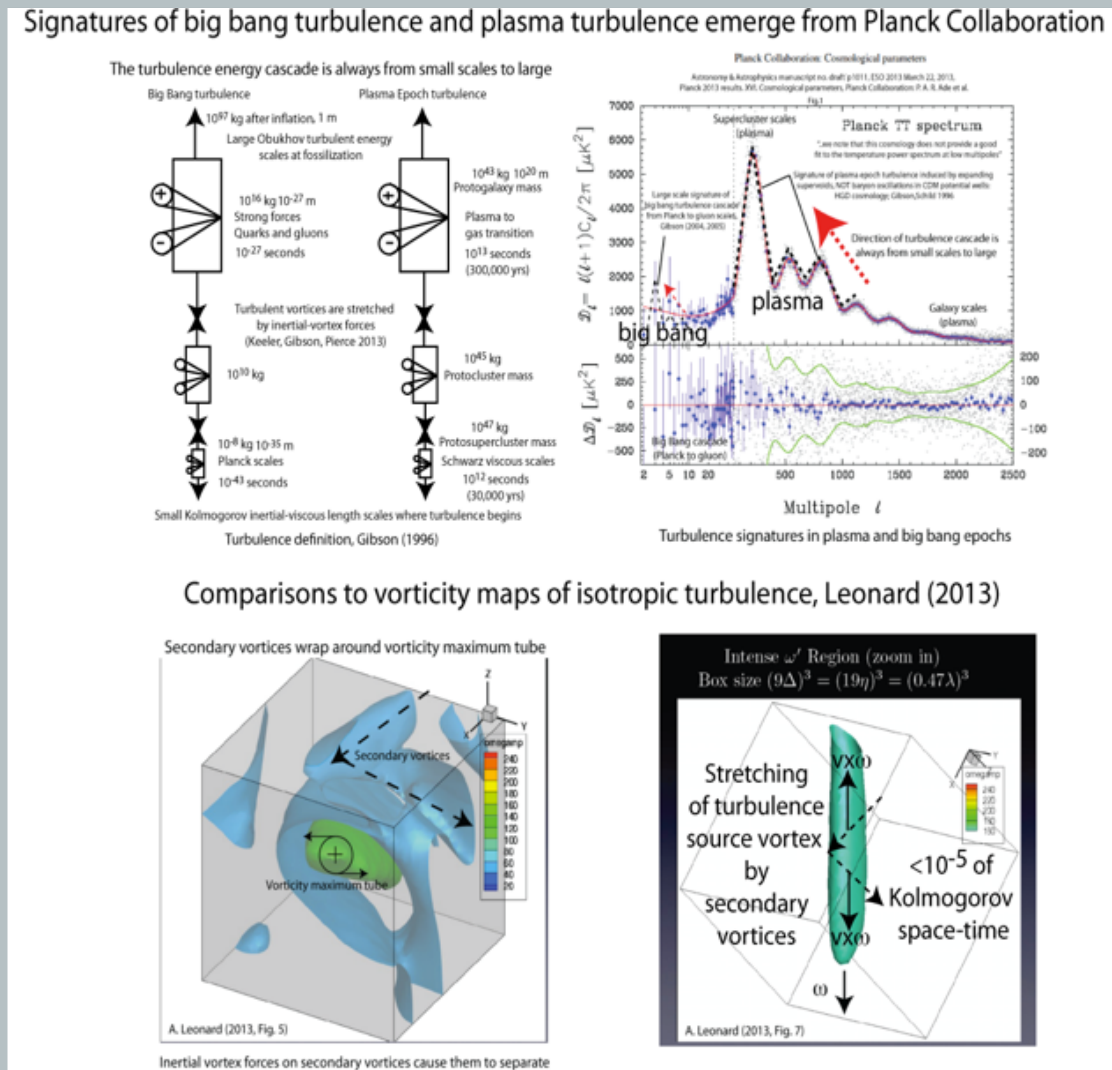
Zeldovich symposium, Tallinn, June 23-28, 2014

Abstract

- **Yakov Borisovich Zeldovich** *pioneered the difficult field of turbulent combustion, and would have appreciated the complexities that arise when collisional fluid mechanics, general relativity, self-gravitational-stratification, fossil turbulence, fossil turbulence waves, and beamed zombie turbulence maser action mixing chimneys are combined in the first turbulent combustion of the big bang. Space telescopes show distinctive fossil turbulence patterns in the cosmic web and in the cosmic microwave background that confirm a big bang turbulent combustion mechanism, where turbulence is defined by inertial vortex forces and Fortov-Kerr negative pressures extract mass-energy from turbulence needed to trigger inflation by gluon viscous stresses of the strong force freeze-out. Such turbulence always cascades from small scales to large (***see journalofcosmology.com volumes 15-23***) and leaves patterns termed fossil turbulence in a variety of hydrophysical fields that preserve information about the previous turbulence. The cosmic microwave background spectrum reveals fossil turbulence patterns at large wavelengths (now >10^25 m) fossilizing big bang turbulent combustion, and smaller wavelengths fossilizing viscous gravitational fragmentation of the plasma epoch at 10^12 seconds to produce ~10^24 m superclusters and superclustervoids now ~10^25 m. The CMB spectral turbulence pattern is a single peak reflecting a highly concentrated vortex, and two secondary peaks reflecting transverse secondary vortices at right angles that stretch the primary vortex by inertial vortex forces into a tubular shape about one part per million of the Kolmogorov space time at the Planck conditions of the big bang. Fortov-Kerr negative stresses exceeded ~ 10^113 Pa to extract mass-energy from the vacuum. The plasma turbulence peak and its two harmonics has been misinterpreted as sonic oscillations of trapped baryons in cold dark matter potential wells.* ***LCDMHC cosmology is generally falsified*** *by the fluid mechanically based cosmology and observations presented, where cold dark matter, dark energy and hierarchical clustering of CDM clumps is questioned.* ***Schild 1996 proved the dark matter of galaxies is earth-mass planets*** *of hydrogen-helium,* ***confirming fluid mechanical predictions of Gibson 1996*** *that instead, plasma superclusters and clusters of protogalaxies fragmented into Jeans mass clumps of planets at the plasma to gas transition, at time 10^13 seconds. Stars and larger planets are formed in these proto-globular-star-cluster clumps by binary mergers.*

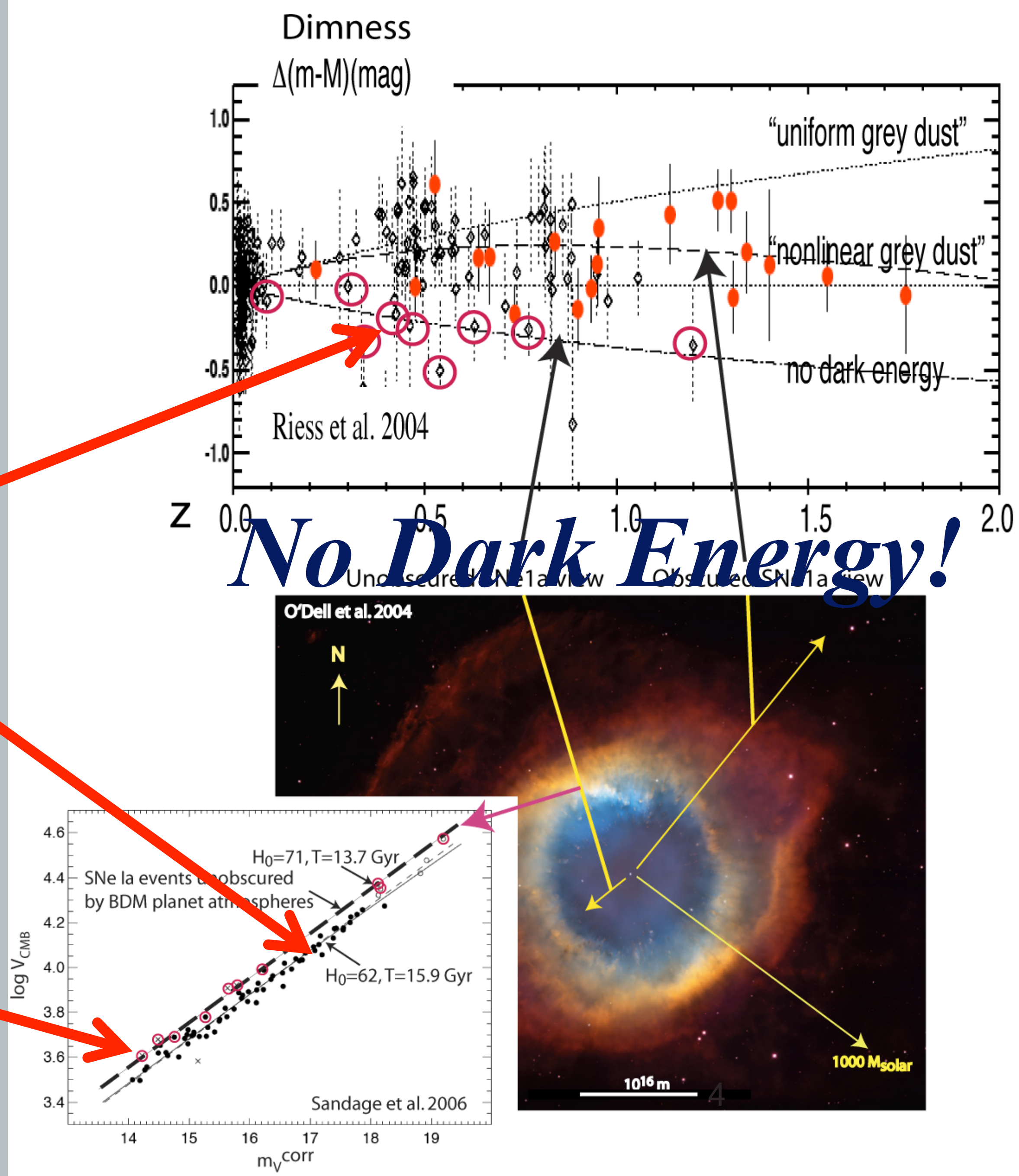


Fossils of big bang and plasma turbulence appear in the cosmic microwave background

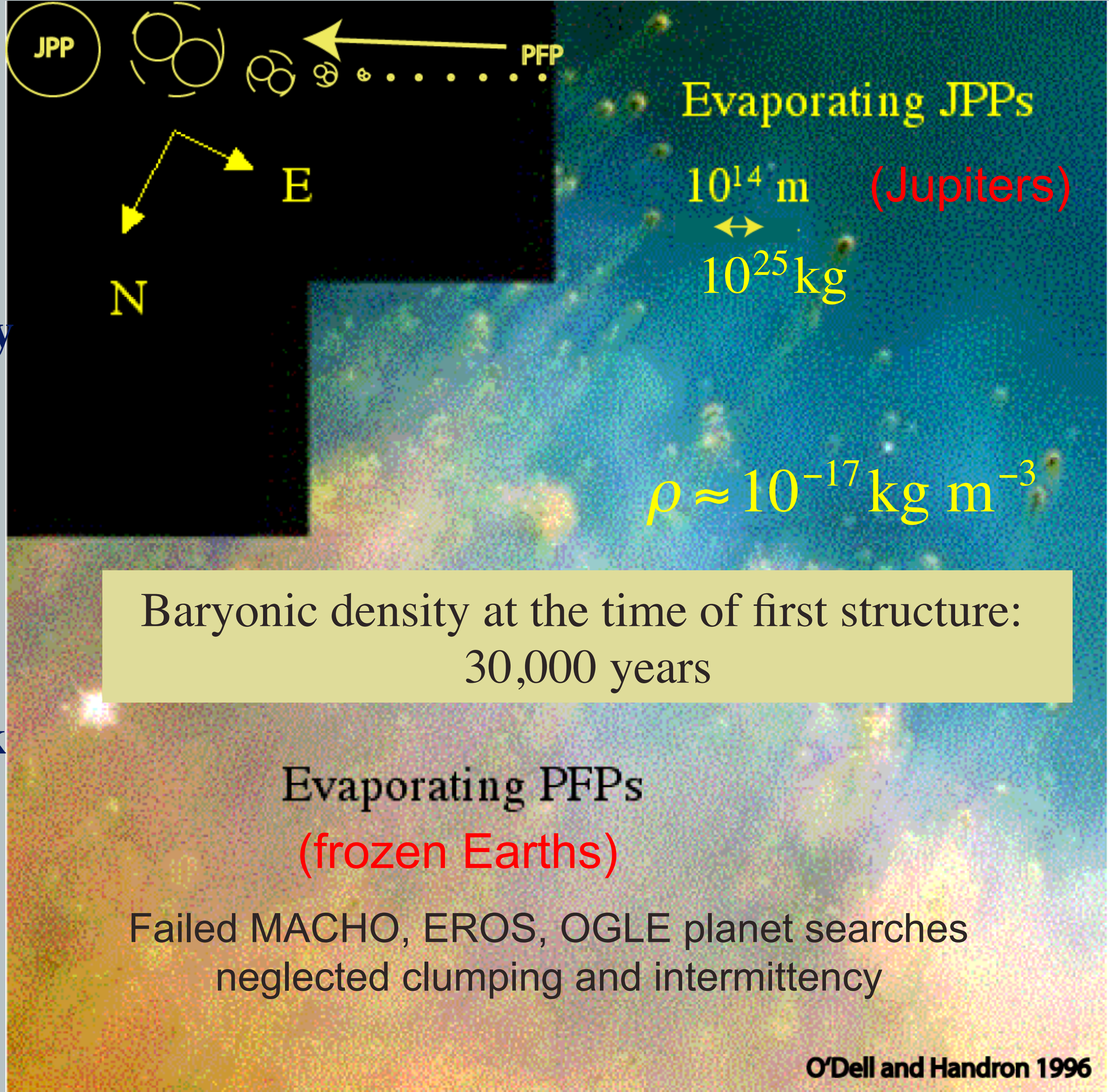


Supernova Ia dimness: BDM planets, NOT dark energy

- Supernova Ia brightness versus red shift z has been used to claim the existence of a very massive "dark energy"
- Helix planetary nebula shows evidence of Jovian planets that explain "dark energy" as a systematic error
- Sandage 2006 SNe Ia Hubble constant universe age 16 Gyr suffers from the same systematic dimming error
- Correction for planet atmosphere dimming gives 13.7 Gyr



Thousands of "comets" surrounding the hot dying star in the Helix planetary nebula are evaporating **primordial fog particles** brought out of cold storage to reveal the dark matter of the Galaxy



Looking down a turbulent vortex line of galaxies

Stephan Quintet before and after Hubble Space Telescope 2009 repair

HST view is down the axis of a fossil turbulent vortex line of galaxies created by weak turbulence at the end of the plasma epoch 300,000 years after the big bang

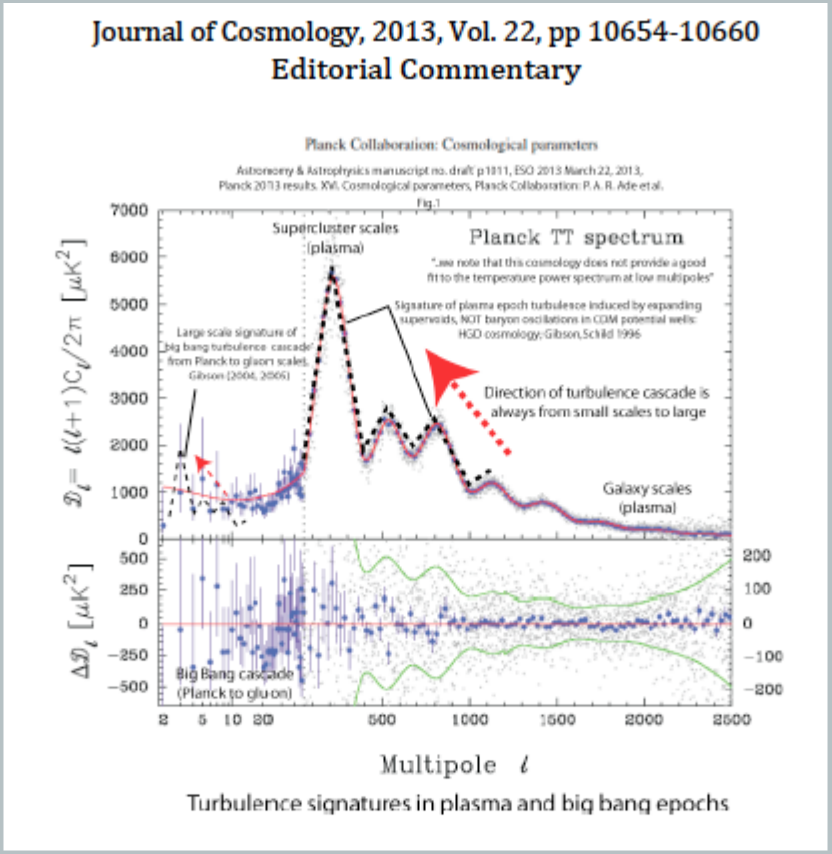
Keeler, Fortov, Zeldovich
26 June 1986

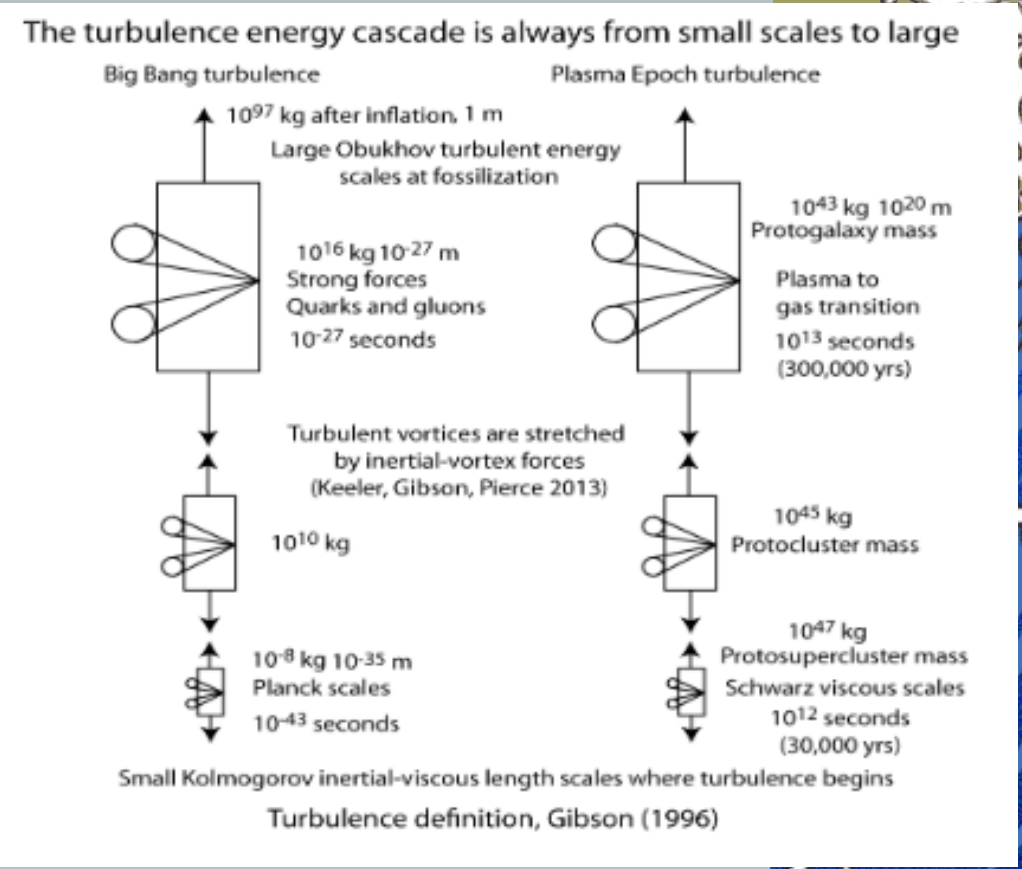
Outline

- *Definition of turbulence by vxw force*
- *Definition requires a turbulent energy cascade from small to large scales*
- *Necessary to define fossil turbulence*
- *Evidence: wakes, jets, boundary layers, mixing layers, big bang*
- *Crucial to oceans, atmosphere, cosmology, astrophysics, astronomy*

Planck CMB spectrum

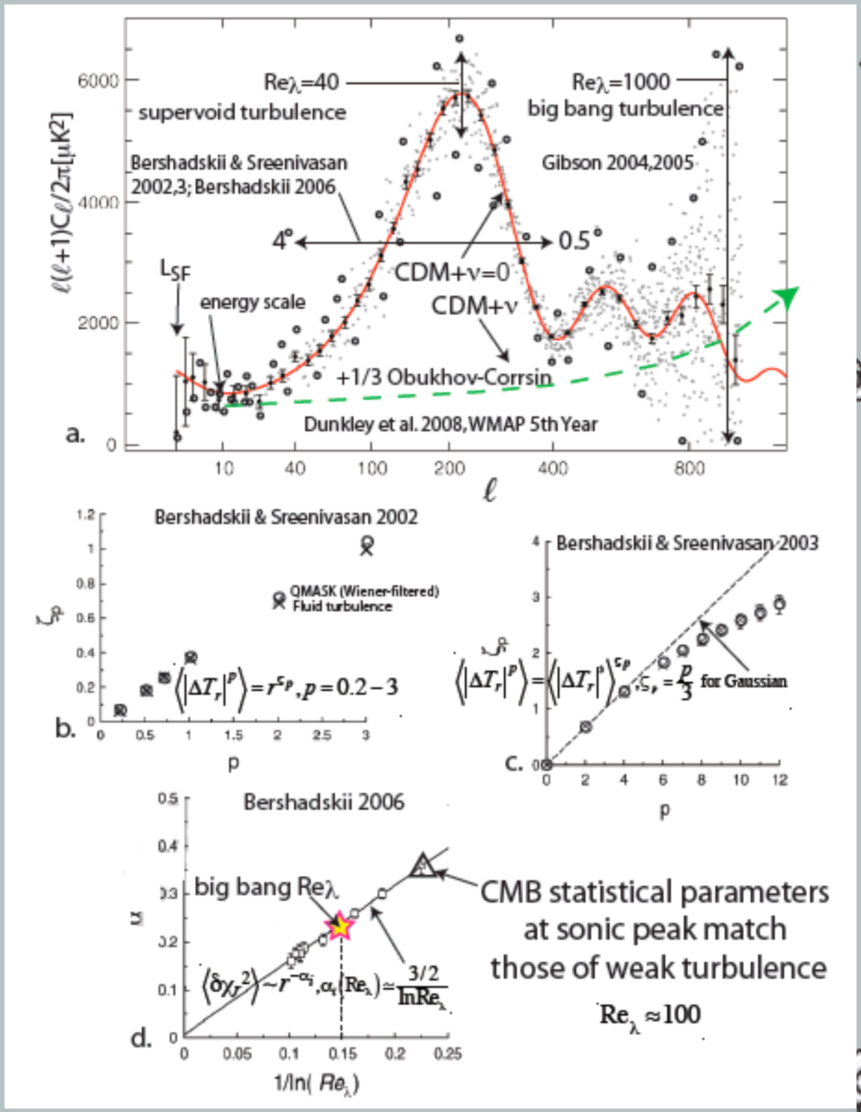
"…we note that this cosmology (ΛCDMHC) does not provide a good fit for small monopoles…"





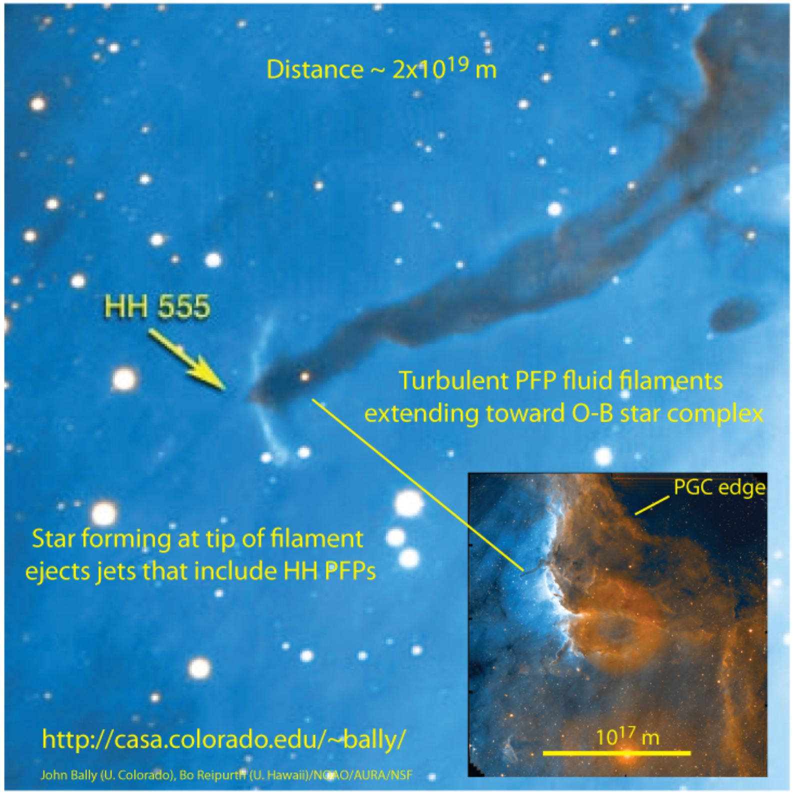
Fossils of supervoid and big bang turbulence detected in the cosmic microwave background (CMB)

- *Weak turbulence at supercluster void boundaries expands at sonic speeds ~c, mixing the temperature*
- *Strong turbulence patterns reflect the gluon viscosity limit of big bang turbulent mixing*
- *Bershadskii and Sreenivasan (2002,3,6) show a clear CMB connection to terrestrial turbulence.*



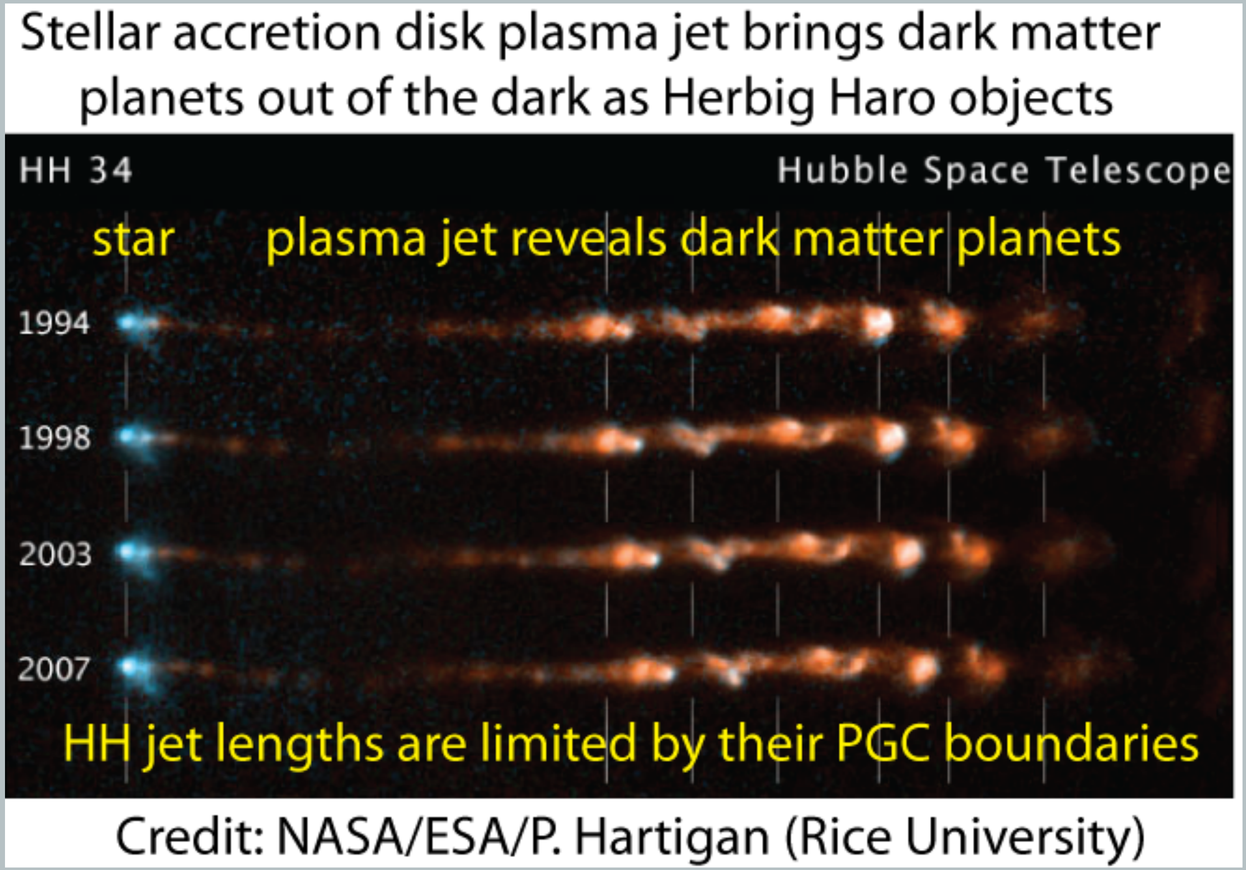
Dark matter planets in PGC clumps make all the stars

Dark matter planets appear as Herbig Haro objects as they form stars



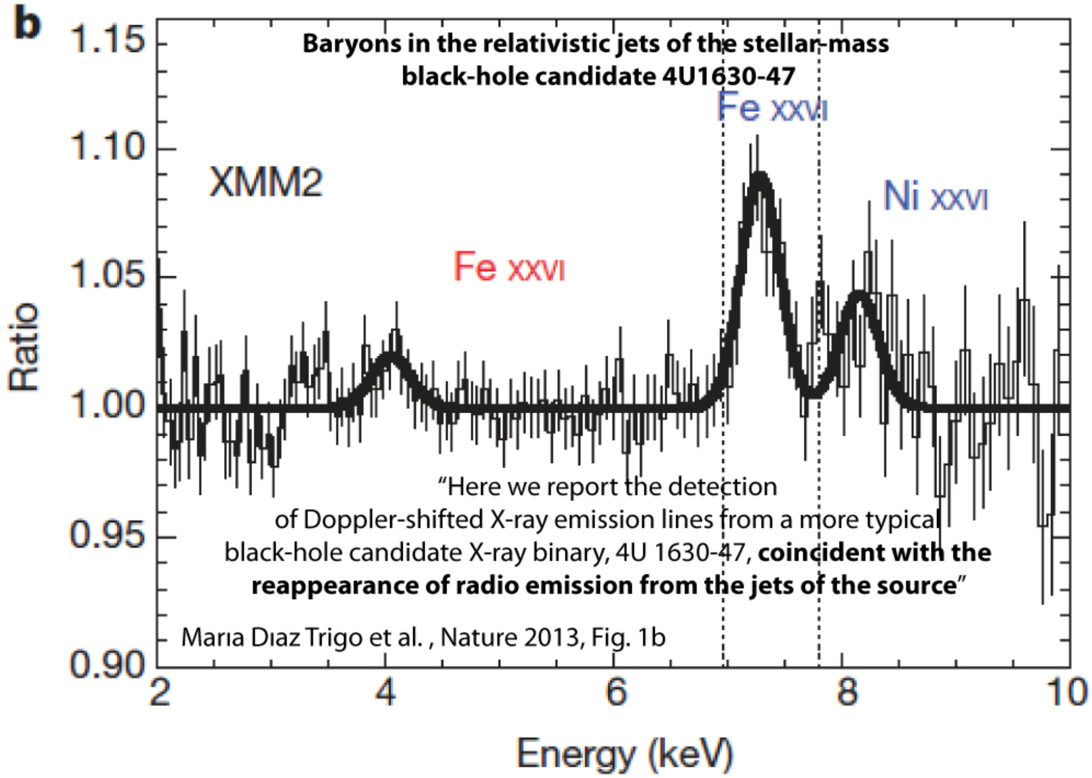
Star formation reveals that the dark matter is clumpy at PFP and PGC scales

Intermittency of interstellar medium shown by star jets



Star jets reveal merging dark matter planets

* A forming X-ray binary star (not a black hole) eats some dark matter planets and its jets turn back on



* HGD cosmology interpretation, Gibson, Schild (1996)

Turbulence in our local PGC clump of dark matter planets

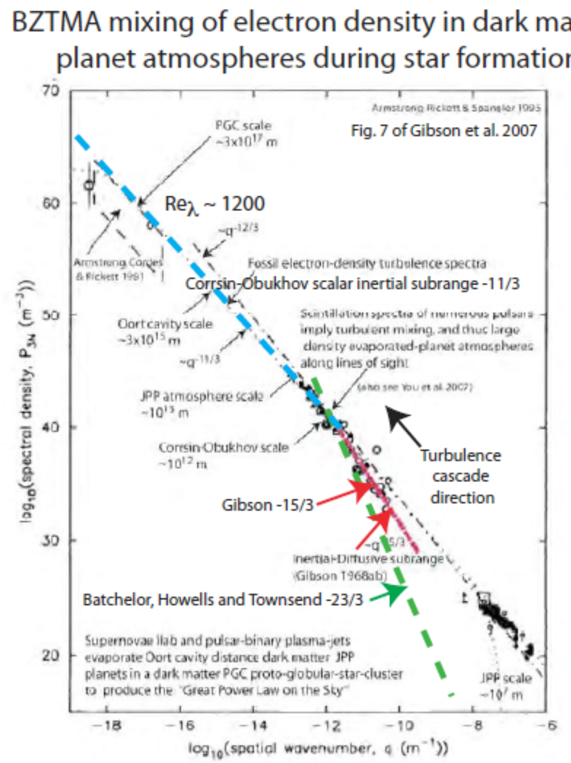


Figure 7. Application of BZTMA mixing theory to understand pulsar electron density fluctuation spectra and star formation from planets[7]. Jovian PFP (primordial –fog-particle) Planets (JPPs) comprise the baryonic dark matter of all galaxies and develop turbulent atmospheres when evaporated by radiation from rapidly spinning white dwarf and neutron stars.

Turbulence from dark matter planets and their PGC clumps

Dark Matter Planets move as fluid particles in turbulent vortex lines, feeding the formation of bright (but not massive) stars, HGD cosmology (Gibson 1996, Schild 1996)

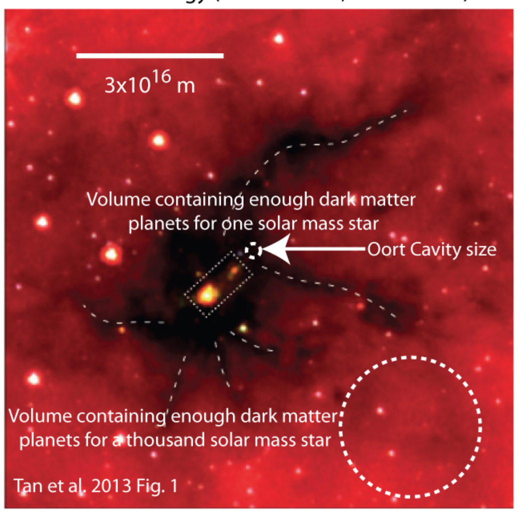
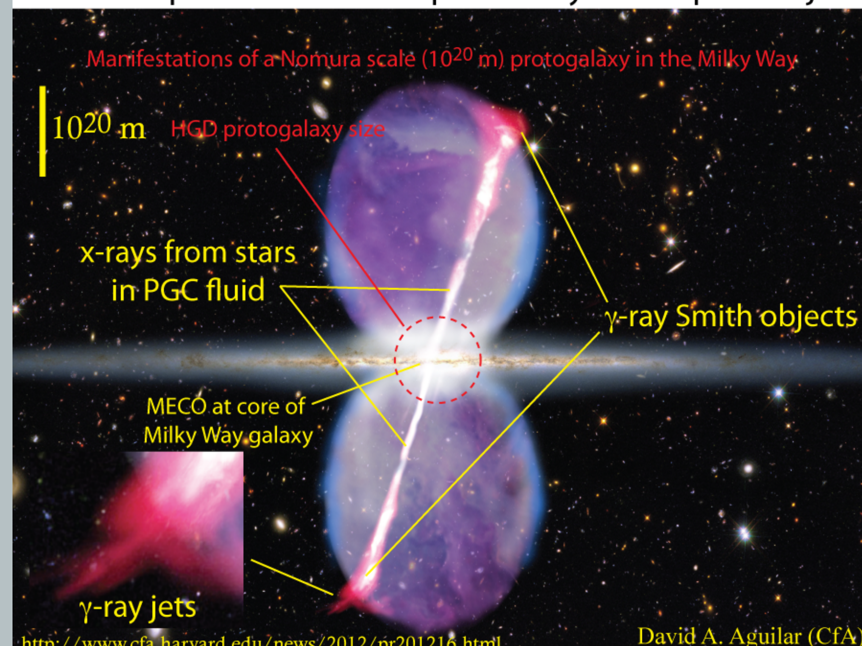


Figure 1 | Collapsing cloud. This infrared image of the SDC335 dark cloud was taken with the Spitzer telescope. Peretto *et al.*[2] find two massive gas cores (dotted box) near the cloud centre, coinciding with infrared sources, which are likely ✕ to be forming massive stars. A web of surrounding filaments (dashed lines) is contracting towards the centre, providing clues to how these cores and stars are forming.

Smith objects show bright star formation triggered from PGC clumps of dark matter planets by MECO plasma jets



Momentum Equation

$$\partial\vec{v}/\partial t = -\nabla B + \vec{v}\times\vec{\omega}$$

$$+\vec{F}_{viscous} + \vec{F}_{buoyancy} + \vec{F}_{Coriolis} + \vec{F}_{other}$$

$$B = v^2/2 + p/\rho + lw$$

Definitions of Turbulence and Fossil Turbulence

Turbulence is defined as an eddy-like state of fluid motion where the inertial-vortex forces of the eddies are larger than any other forces that tend to damp the eddies out.

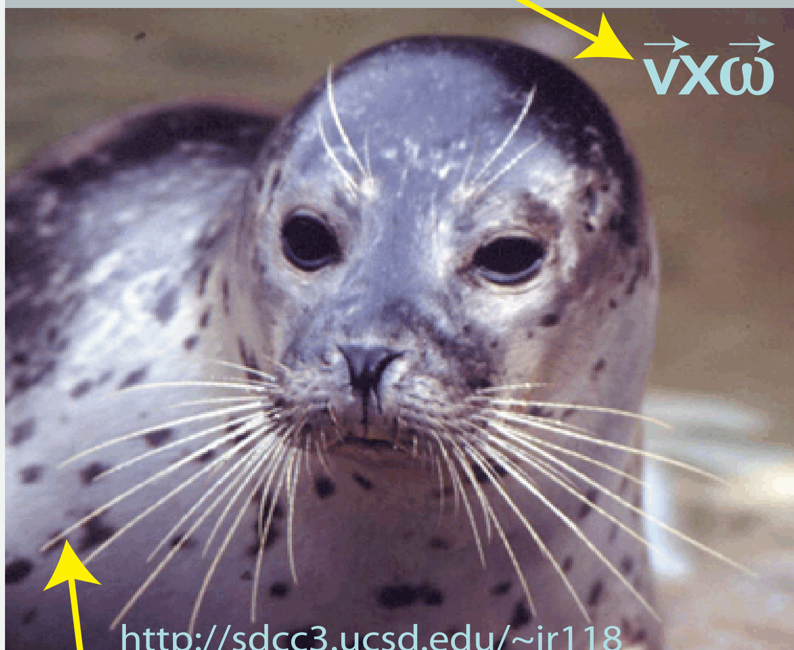
Turbulence ALWAYS cascades from small scales to large

Fossil turbulence is defined as a perturbation in any hydrophysical field produced by turbulence that persists after the fluid is no longer turbulent at the scale of the perturbation.

Definitions of turbulence and fossil turbulence and the direction of the turbulence cascade

Turbulence is defined as an eddy-like state of fluid motion where the inertial vortex forces of the eddies are larger than any of the other forces that tend to damp the eddies out.

Fossil turbulence waves allow seals to survive dark polar winters



ossil Vorticity Turbulence Detectors

Turbulence ALWAYS cascades from small scales to large

Fossil turbulence is defined as a perturbation in any hydrophysical field produced by turbulence that persists after the fluid is no longer turbulent on the scale of the perturbation.

Turbulence always cascades from small scales to large

Physical Mechanisms

$$\vec{v} \times \vec{\omega}$$

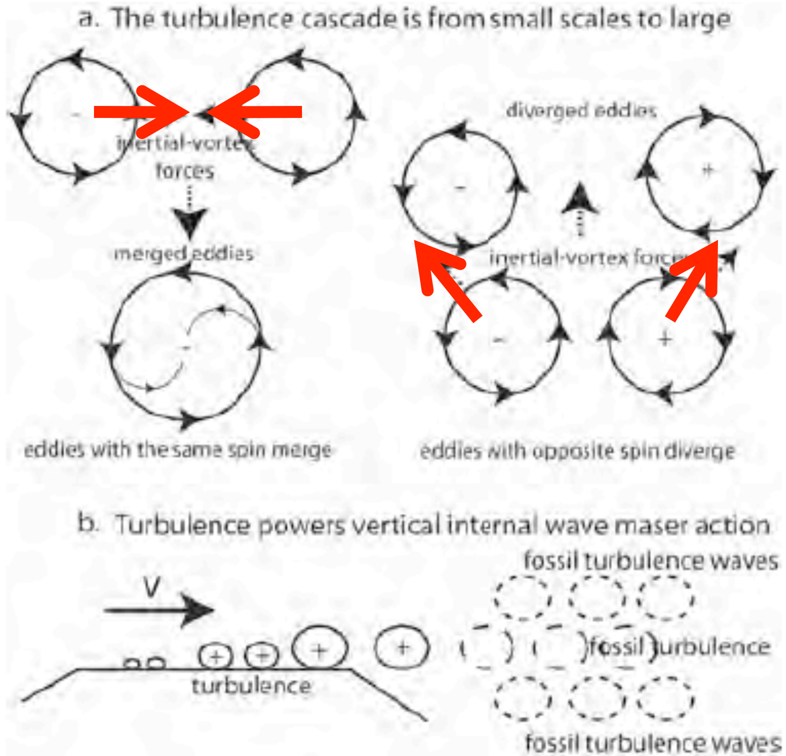
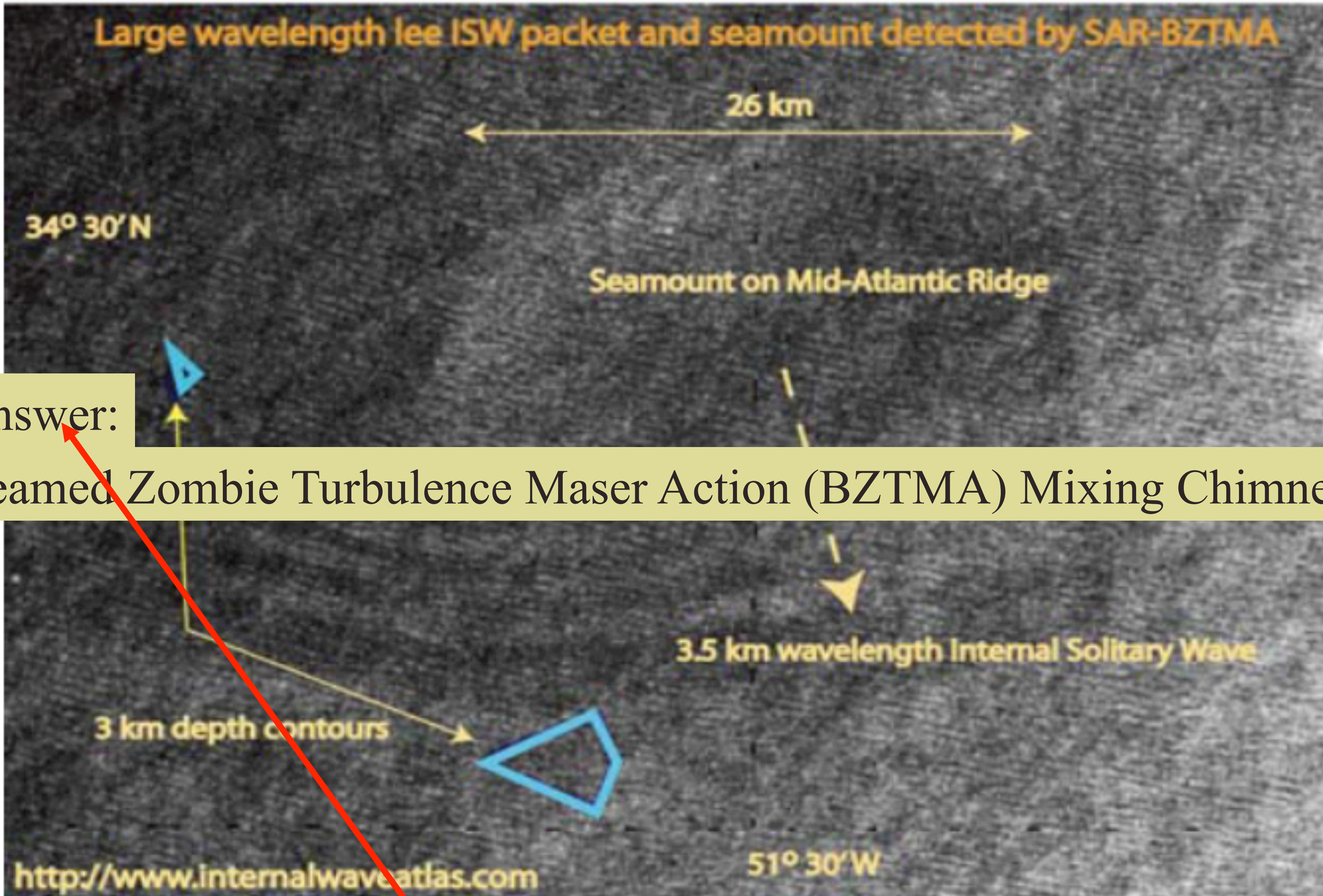


Figure 3. Physical mechanisms of turbulence and stratified turbulence. a. Vortex mechanisms of the turbulence cascade from small scales to large. Adjacent eddies with the same vorticity produce inertial vortex forces $\vec{v} \times \vec{\omega}$ (dashed arrows) that cause merging. Nearby eddies with opposite spin diverge and expand the turbulent region driven by $\vec{v} \times \vec{\omega}$ forces. b. Turbulence, fossil turbulence, and fossil-turbulence-waves in a stratified fluid produce internal-wave maser-action where turbulent kinetic energy fossilized by buoyancy forces is radiated near vertically as fossil turbulence waves (FTWs).



Answer:

Beamed Zombie Turbulence Maser Action (BZTMA) Mixing Chimneys

Figure 1. Seamount and internal tidal waves from space. How is this information transmitted?

Aircraft crashes from big bang turbulence mechanism

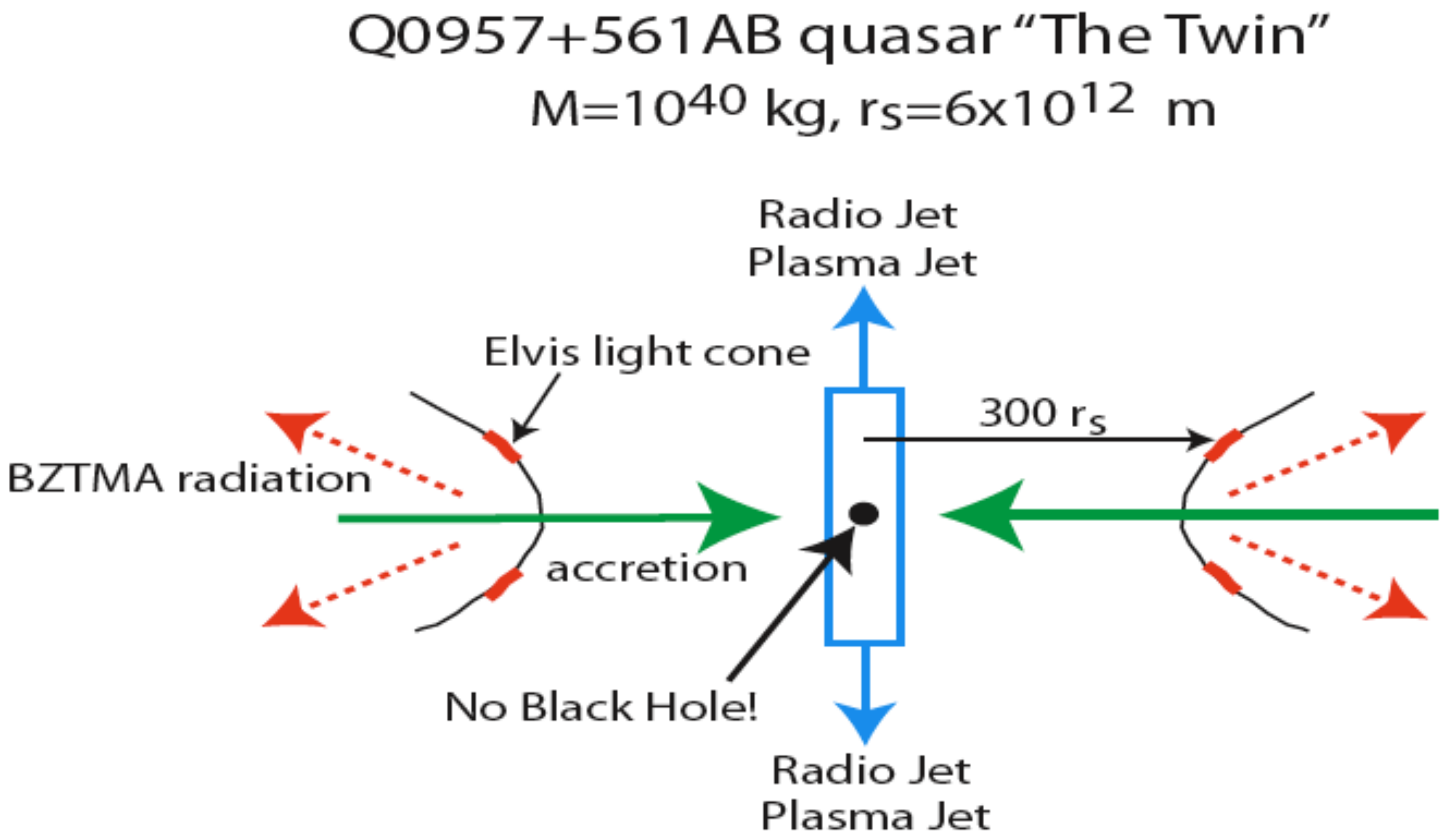
Conclusions –new cosmology

1. *Hydro-Gravitational Dynamics (HGD) describes the gravitational structure formations of cosmology*
2. *The standard ΛCDMHC model is wrong and must be abandoned*
3. *Galaxy dark matter is primordial PFP planets in PGC clumps*
4. *No dark energy!*

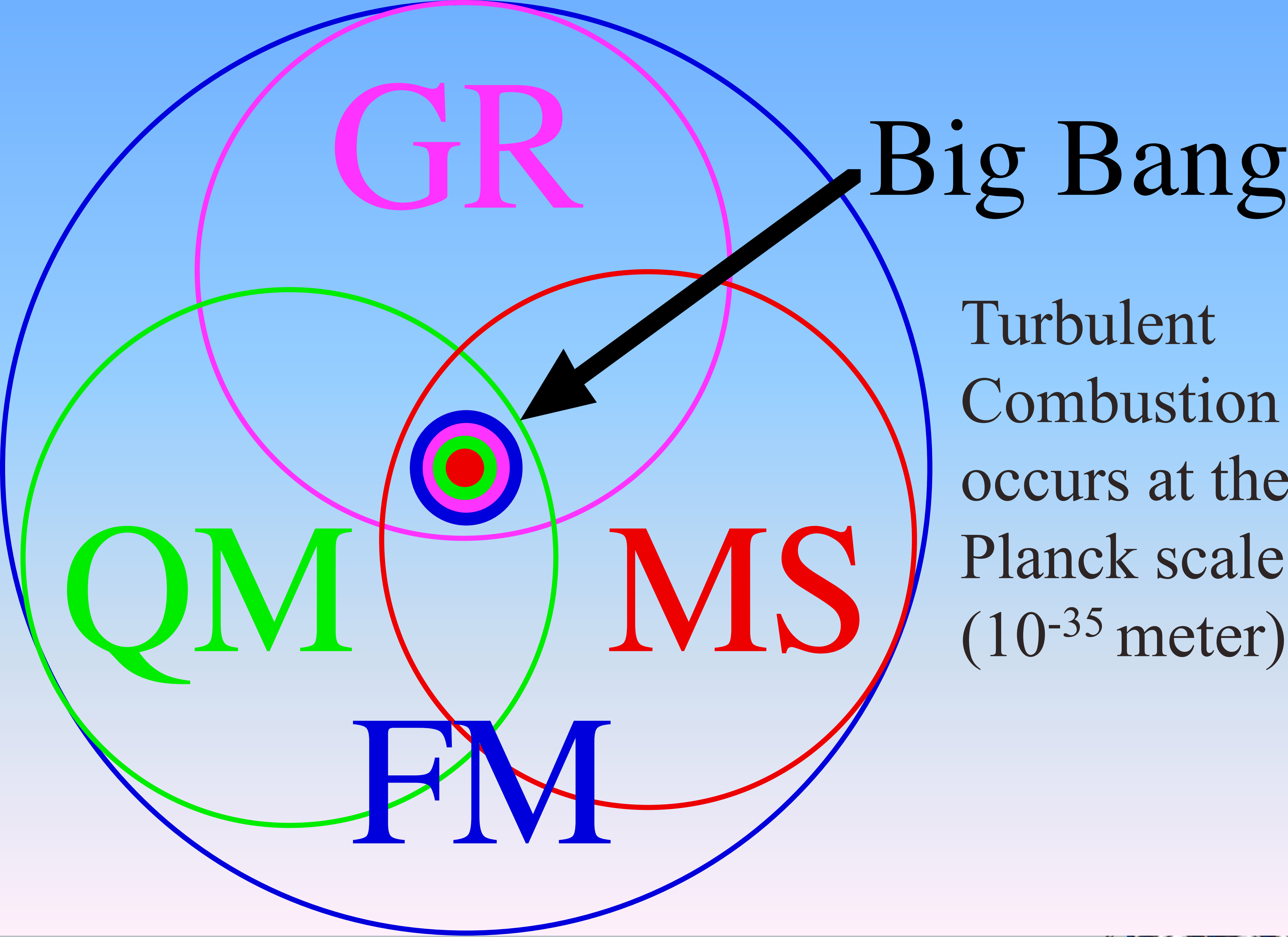
Conclusions-natural fluids

- ***Turbulence is driven by inertial-vortex forces***
- ***Turbulence cascades from small scales to large***
- ***Turbulence in natural fluids fossilizes at large scales***
- ***Vertical and radial transport involves a complex interaction between turbulence, fossil turbulence , zombie turbulence, and zombie turbulence waves***
- ***Intermittency effects cannot be neglected***

The End



BZTMA radiation in galaxy centers



Turbulent Combustion occurs at the Planck scale (10^{-35} meter)

Critical Turbulence Length Scales

$$L_H = ct$$

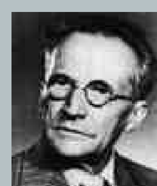
$$L_S = mG / c^2$$

$$\left[L_K = \left(\nu^3 / \varepsilon \right)^{1/4} \right]_P \approx L_P = \left(c^{-3} hG \right)^{1/2}$$

$$L_P = \left(c^{-3} hG \right)^{1/2}$$

$$L_R = \left(\varepsilon / N^3 \right)^{1/2} = L_{ST} = \left(\varepsilon / \left(\rho G \right)^{3/2} \right)^{1/2}$$

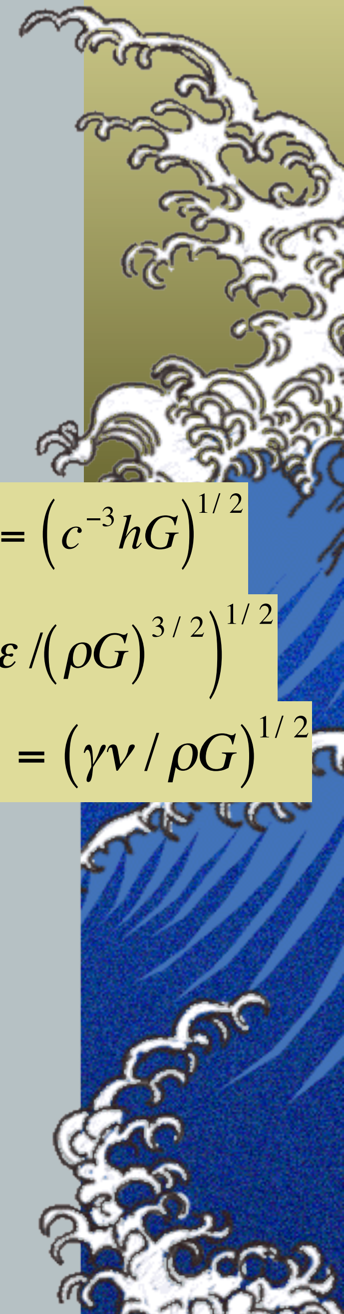
$$L_{RF} = \left(\gamma \nu / N^2 \right)^{1/2} \sim L_{SV} = \left(\gamma \nu / \rho G \right)^{1/2}$$



$$L_C = h / mc$$

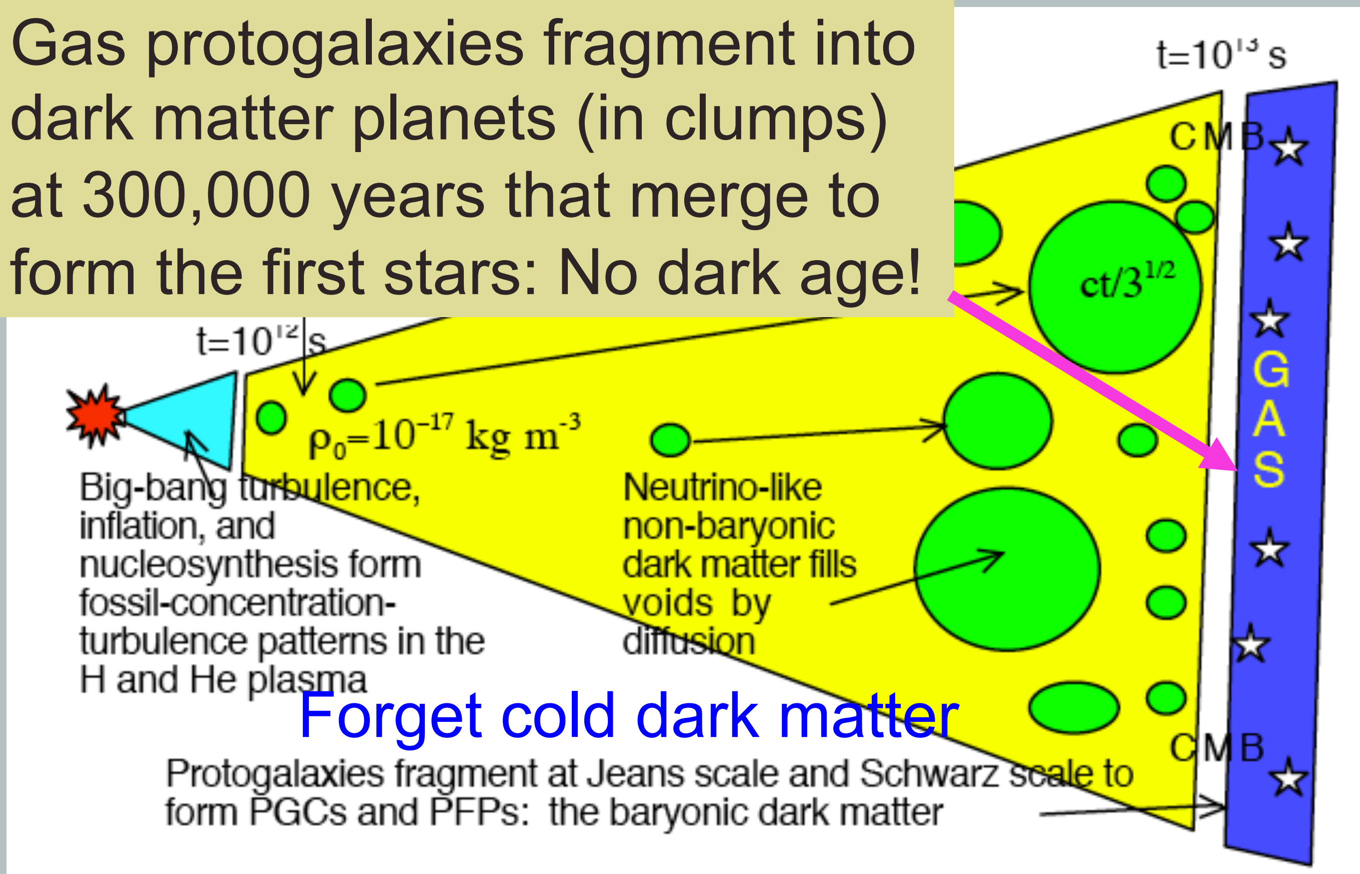
$$L_J = V_{sound} / \sqrt{\rho G}$$

$$L_{SD} = \left(D^2 / \rho G \right)^{1/4}$$



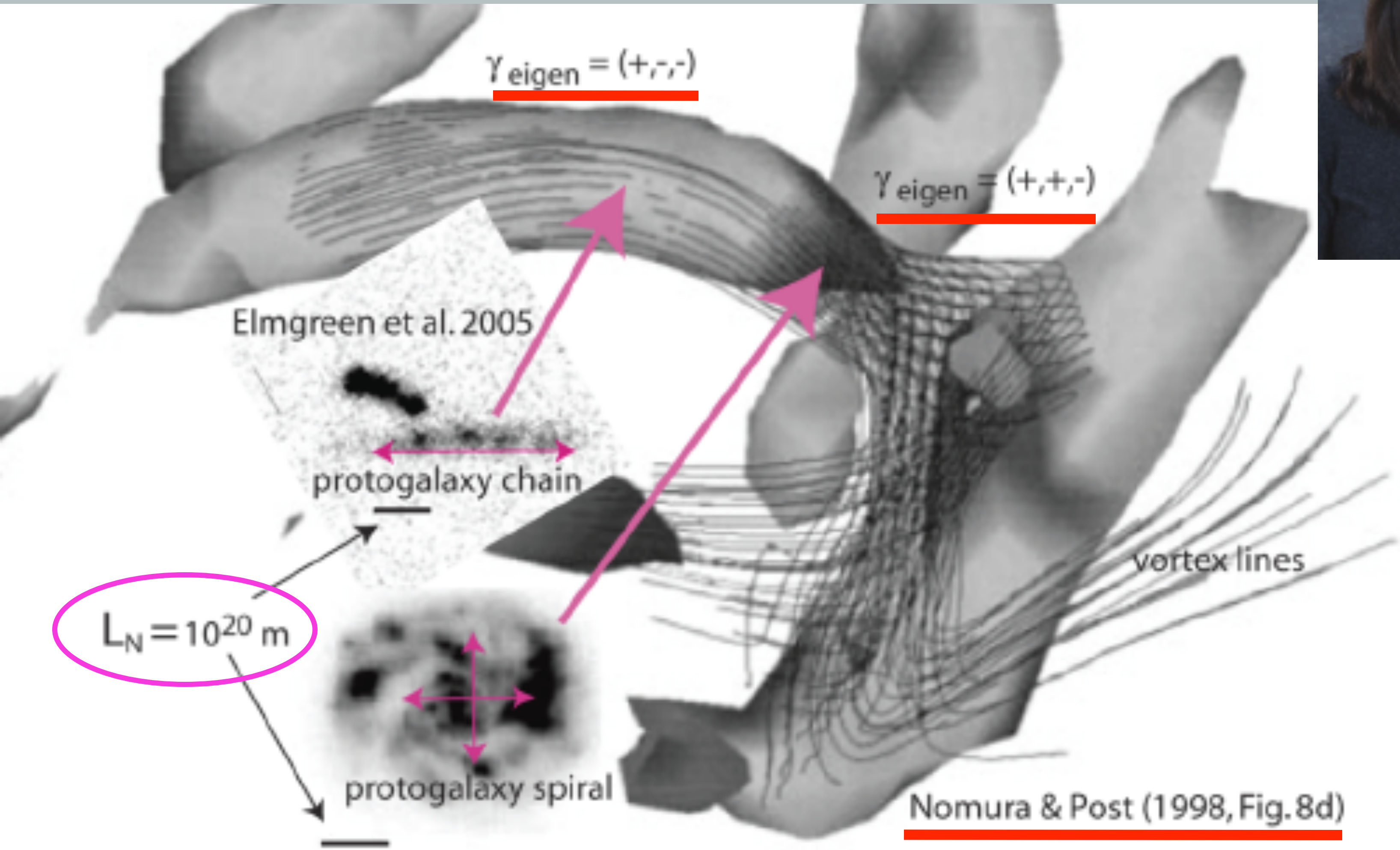
Hydro-gravitational structure formation after the big bang

Gas protogalaxies fragment into dark matter planets (in clumps) at 300,000 years that merge to form the first stars: No dark age!



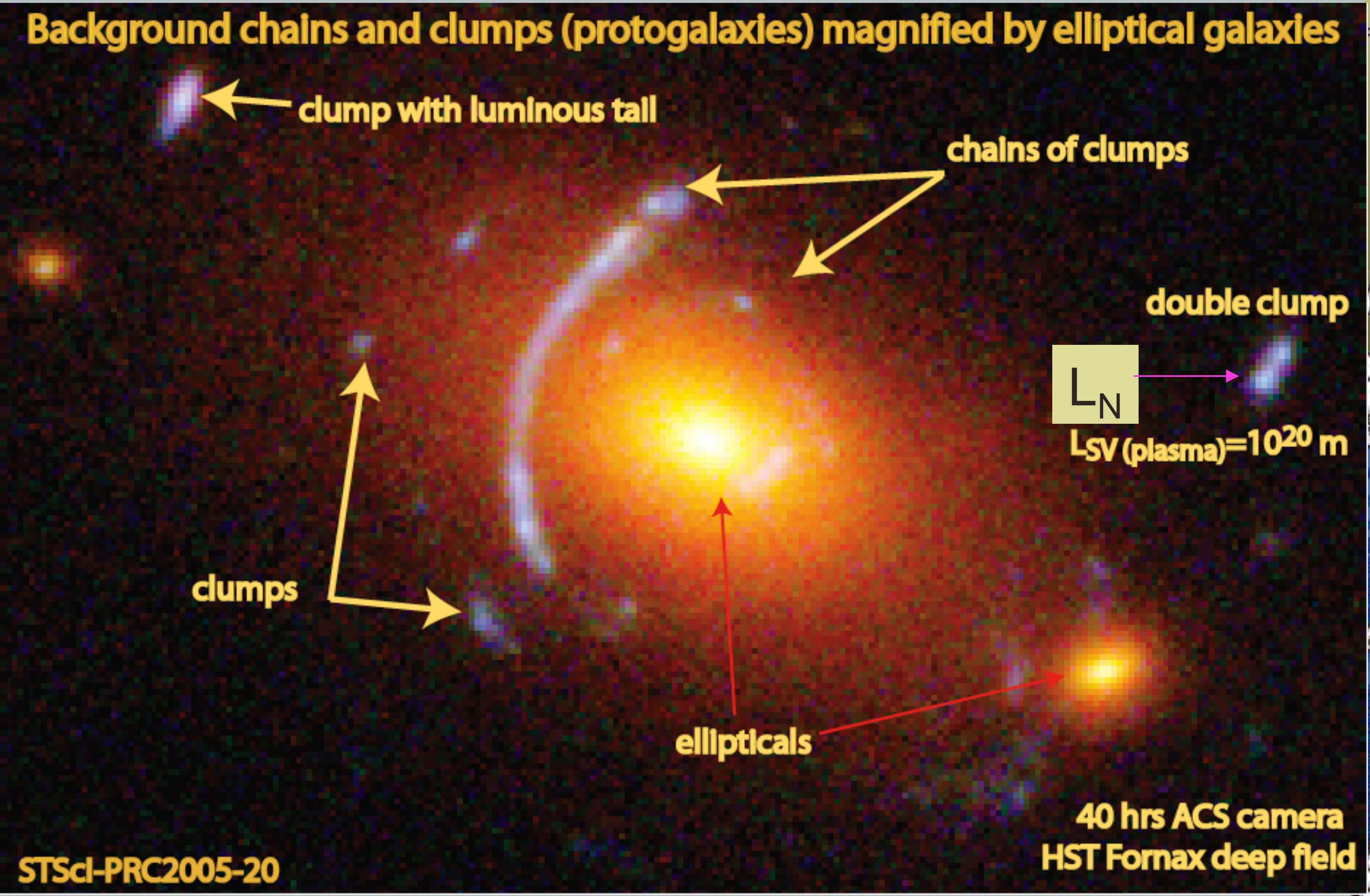
Protogalaxies fragment along turbulent vortex lines and in spiral pancakes

The Nomura Scale



Protogalaxies fragment along turbulent vortex lines and in spiral pancakes

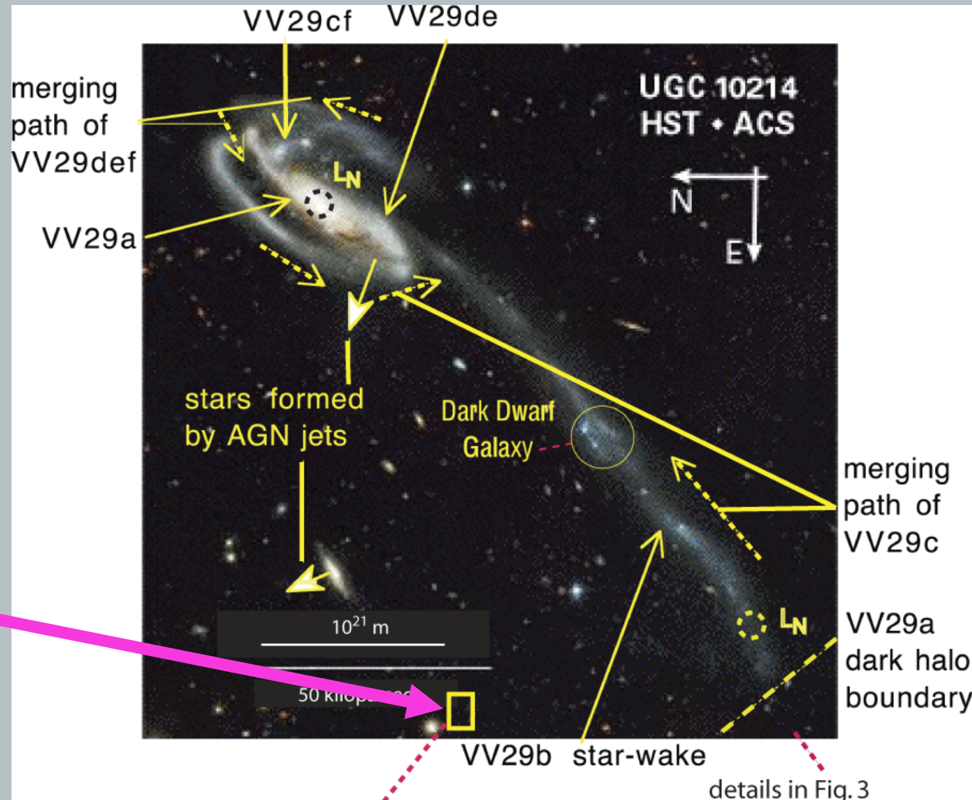
Gravitational magnification of dim protogalaxies

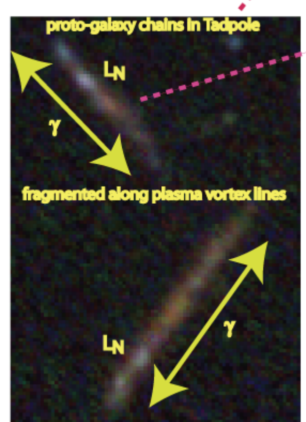


Tadpole galaxy (VV29) merger

High resolution HST images reveal the PGC composition and large size of the VV29a dark matter halo

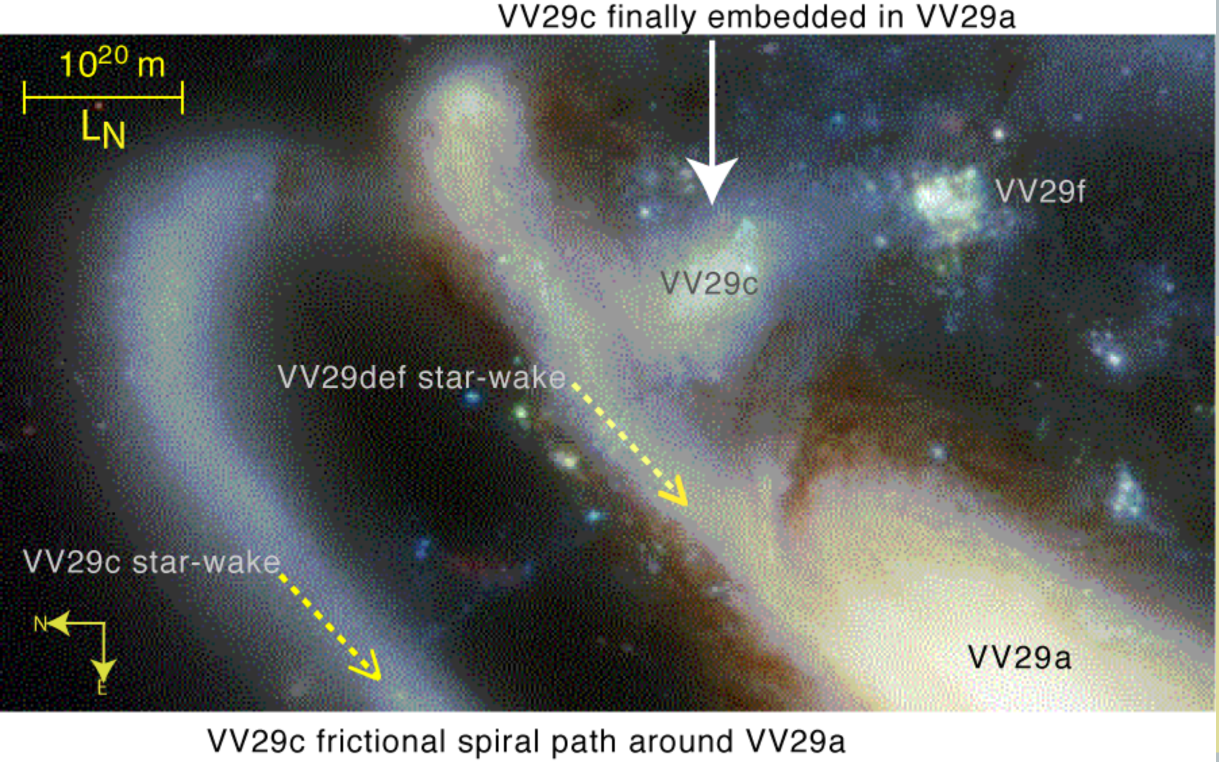
Background reveals protogalaxies in chains, demonstrating that protogalaxy formation occurred by gravitational fragmentation during the plasma epoch





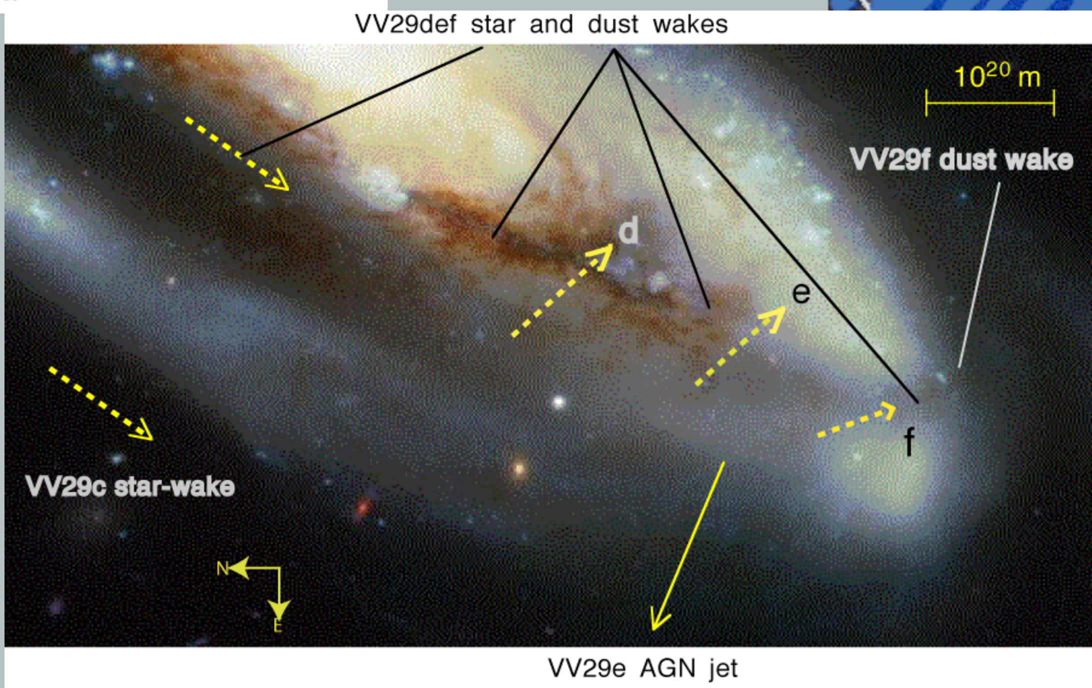
Many of the dimmest and most distant luminous objects [11] are linear "chain galaxies", doublets, triplets, and tadpoles interpreted here as proto-galaxies fragmented at size L_N in the viscous plasma epoch along turbulence vortex lines . The luminosity reflects stars formed in the baryonic dark matter halos, whose PGC-viscosity resists stretching by the expansion of the universe with rate-of-strain $\gamma = t^{-1}$ [5,6]. PFP-planet-viscosity keeps the PGCs in meta-stable equilibrium.

Star and dust wakes in the dark matter halo



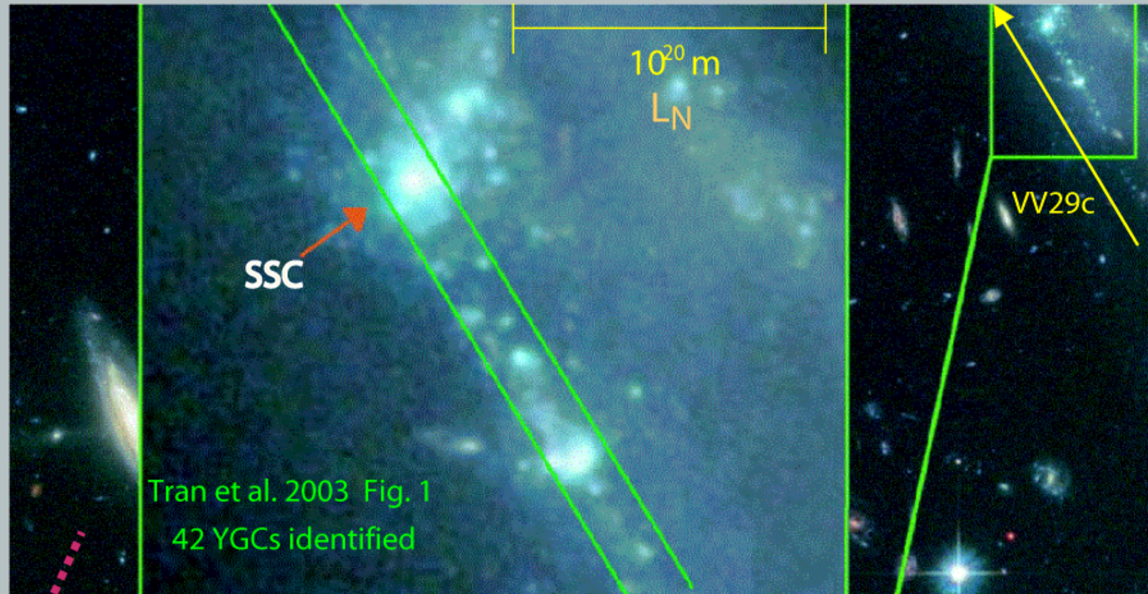
- *VV29c and VV29f in disk*
- *VV29 d and VV29e in core*

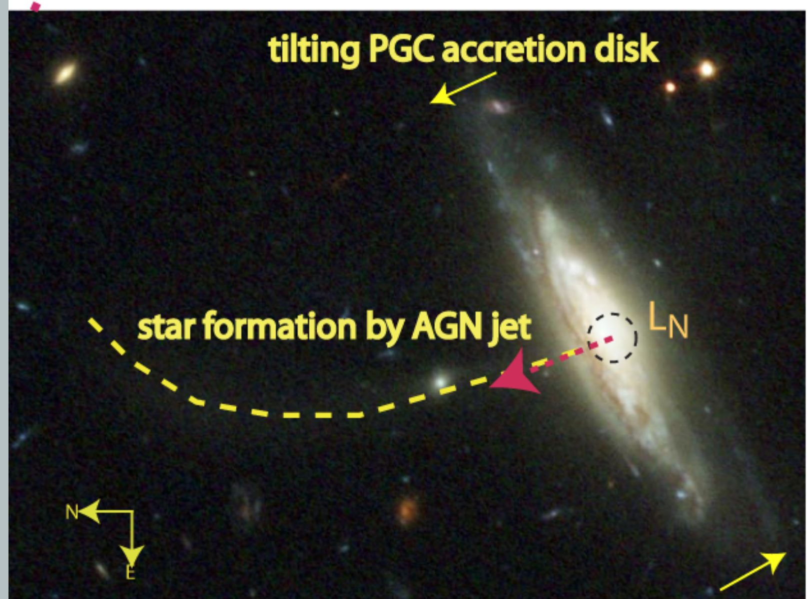
- *Dark matter must be baryonic to form stars*
- *The observations indicate dark matter planets in clumps as the halo dark matter*



•Young globular star clusters are brought out of the dark by the merger event

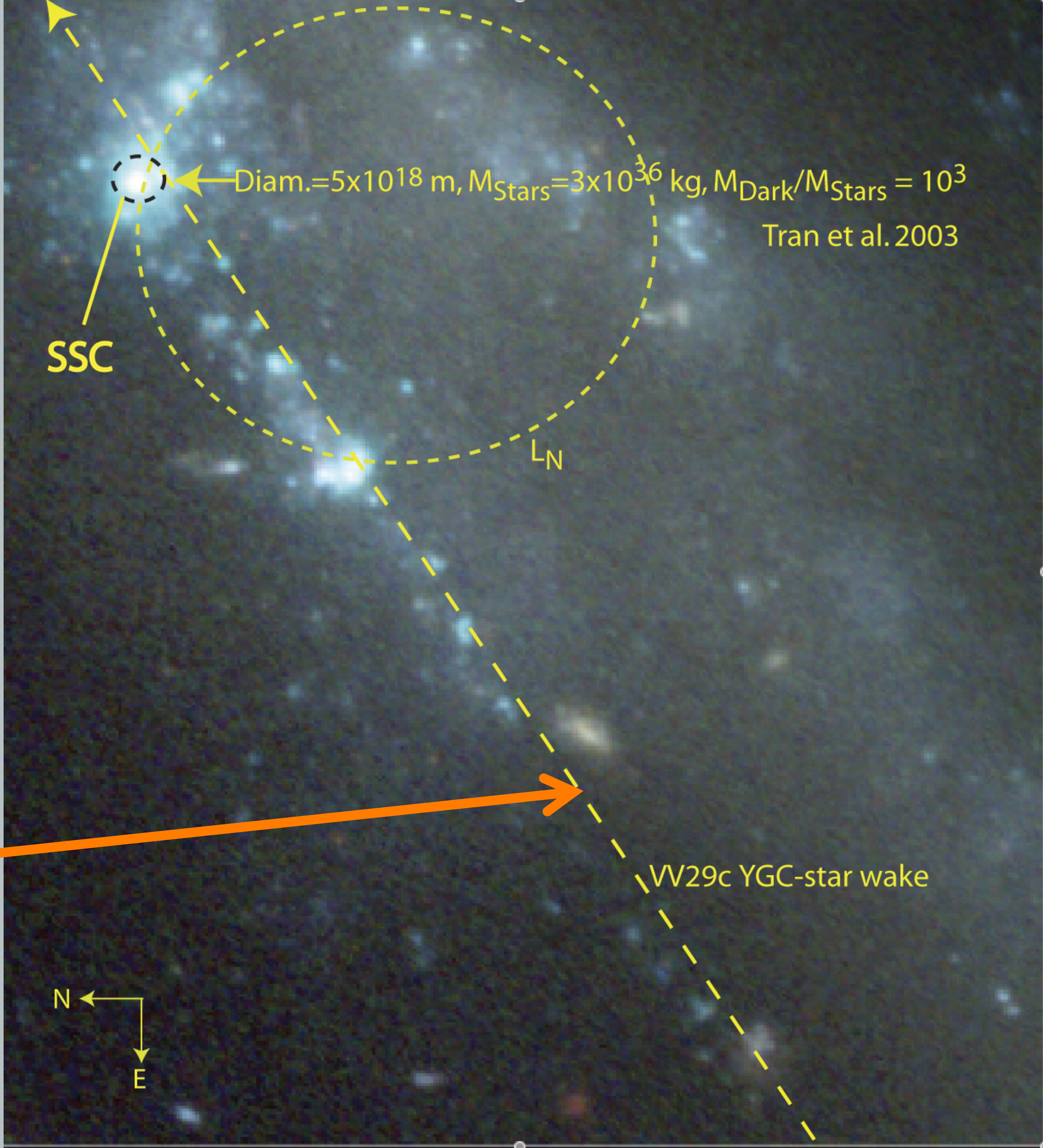
•Star formation reveals the galaxy dark matter is frozen planets in PGC clumps





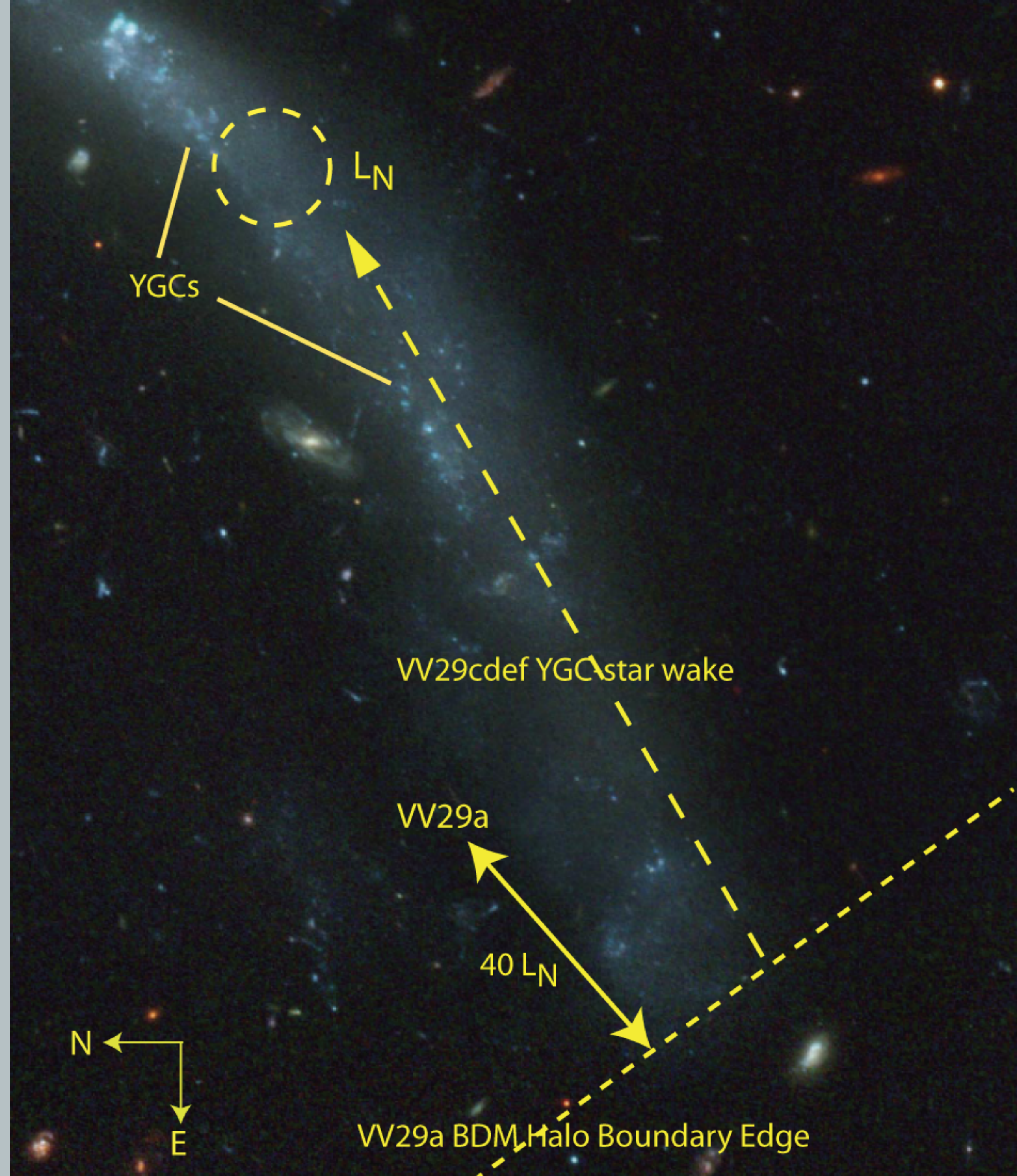
AGN jet triggers star formation in a galaxy's dark matter halo. The spiral star and dust trails triggered in the PGC accretion disk reveal the BDM, and show that the disk is tilting within the halo.

- Young globular star clusters
- Dozens of them in a precise row cannot be anything but a wake



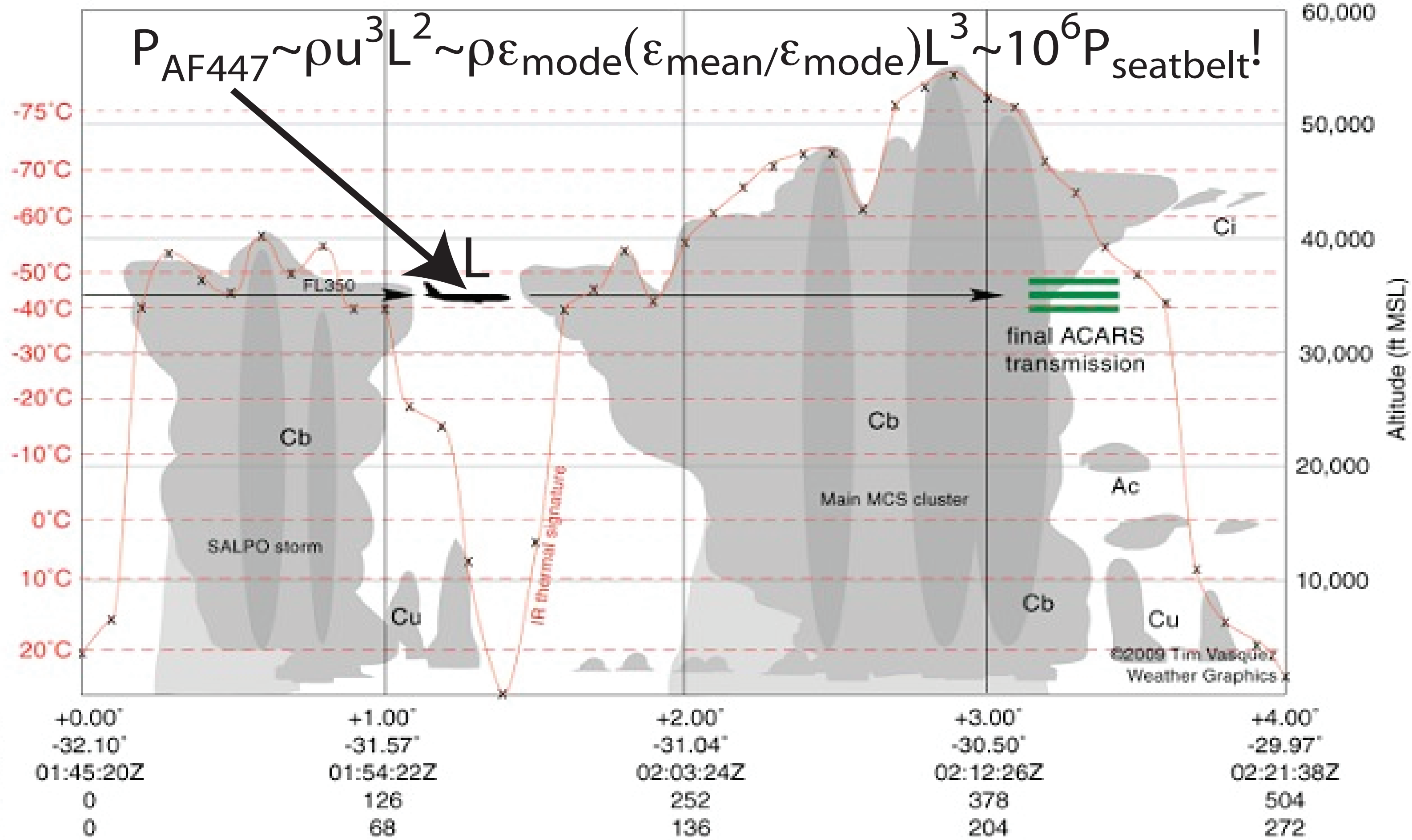
The dark halo boundary

- *Stars are triggered to form young globular clusters*
- *The wake size L_N reflects the plasma protogalaxy scale*



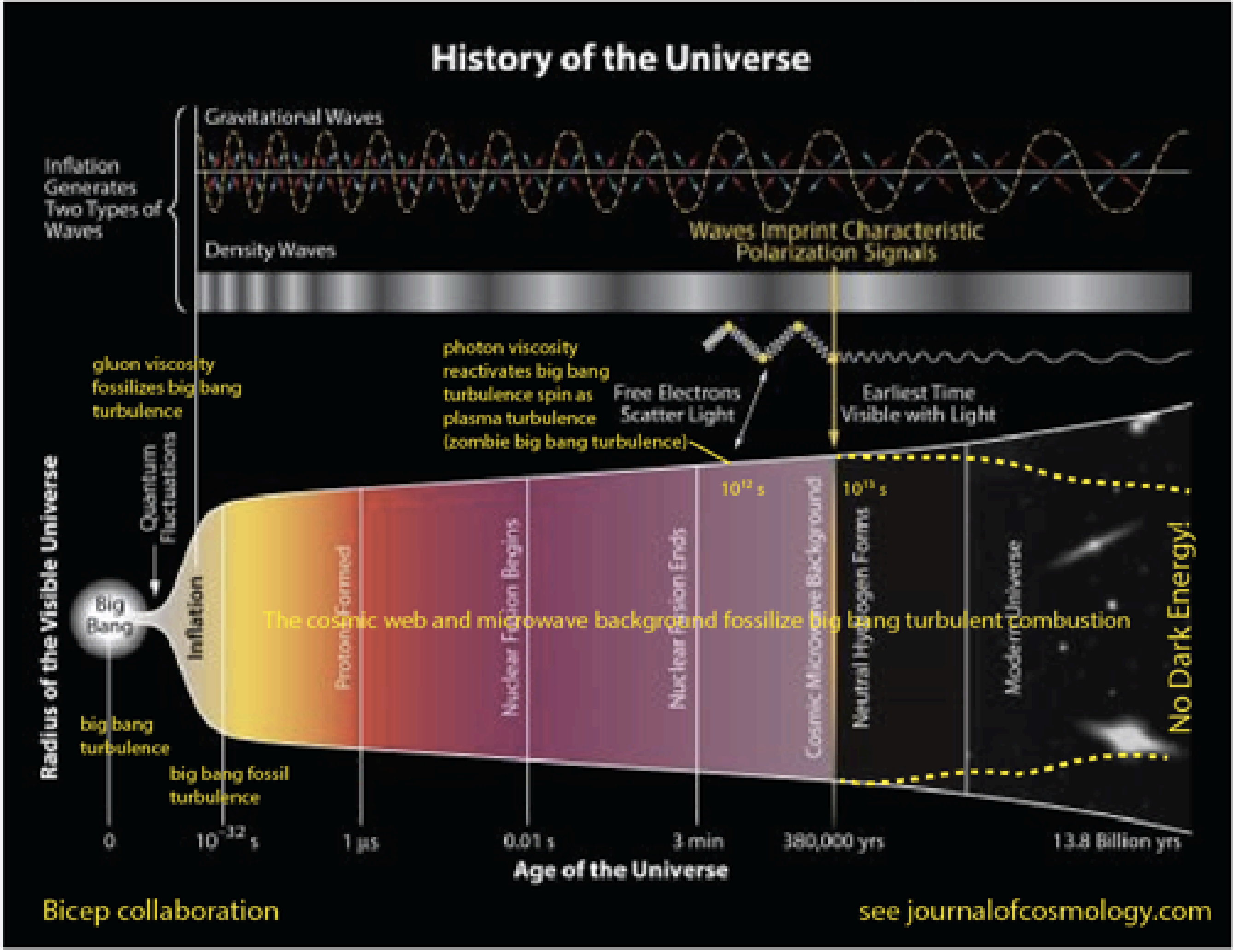
Arithmetic mean ε values in ocean and atmosphere require many samples

$$P_{AF447} \sim \rho u^3 L^2 \sim \rho \varepsilon_{mode}(\varepsilon_{mean}/\varepsilon_{mode}) L^3 \sim 10^6 P_{seatbelt}!$$



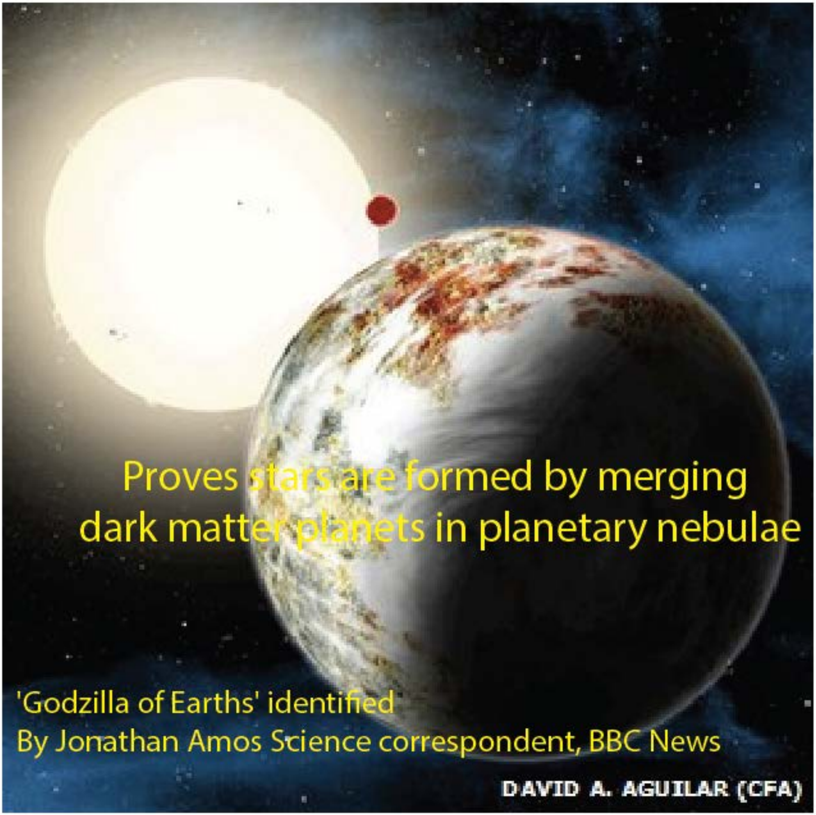
Projected flight path
blended with infrared satellite analysis
AIR FRANCE FLIGHT 447

Polarization of CMB light reflects fossil big bang turbulence spin



Dark Energy is a systematic SNIa dimming error by the dark matter planets that form explosive carbon stars

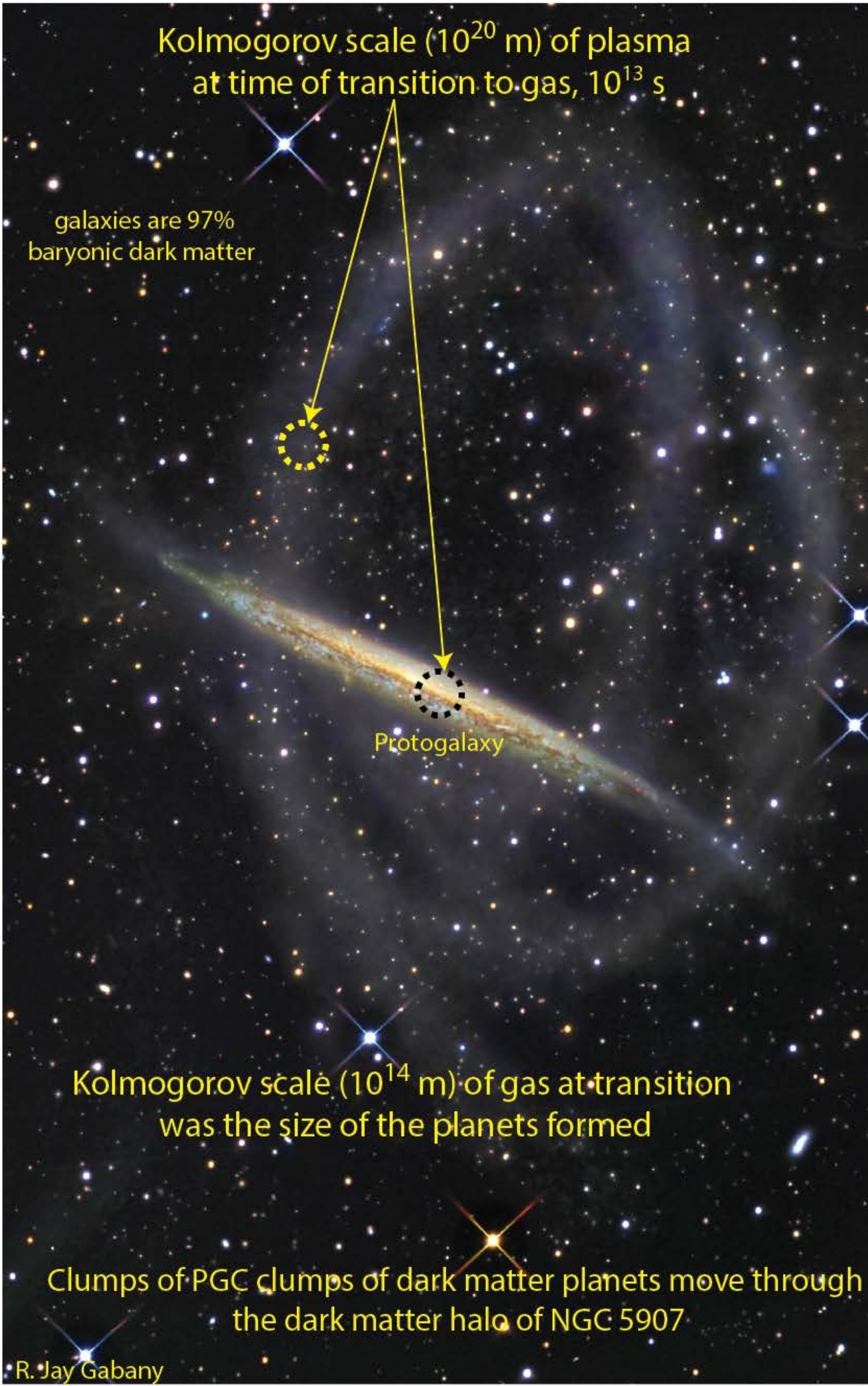
Kepler 10-c exoplanet with 17 Earth mass and rock-iron density



Artist's impression: Scientists say the "mega-Earth" Kepler-10c has a density greater than our own world

Gibson, Carl H., Poster 2, Session A, 23 June 2014, IAU 308, Tallinn, Zeldovich and the cosmic web

Protogalaxy fragments move through a dark matter halo making stars by triggered mergers of dark matter planets



How cosmology works

In the beginning there was turbulence and fossil turbulence

And then there were quarks, protons, neutrons and electrons

In the plasma there was turbulence and fossil turbulence

And then there were supercluster voids, superclusters, clusters, and galaxies

And then there was gas

In the gas there were dark matter planets in clumps

And then there were stars, and supernovae, and stardust

And then there were oceans of water on the planets

And Lo, there was life!

See journalofcosmology.com