

Taking a Close Look at Big Bang Cosmology (BBC): *is it really logical?*

© Don Richardson, 2010

This paper encapsulates an original cosmological treatise offered by the author as part of his fifth book, *Unhidden* (Xulon Press, 2009). For a full presentation of that cosmology and related topics, see *Unhidden* (the 2011 *updated* edition available only from www.donrichardsonbooksales.com.)

Big Bang Cosmology's main premise is designed to explain two proven facts about the cosmos:

- I. **The cosmos is expanding.**
- II. **The cosmos is pervaded with *cosmic microwave radiation*.**

Given its current expansion, three questions rise about the cosmos:

- 1) Has the cosmos been expanding since it began?
- (2) Was the cosmos initially stationary before it began expanding?
- (3) Is the cosmos expanding now *due to the reversal of an initial contraction*?

Choosing the first of the above three options obligates BBC theorists to posit the cosmos, despite its present mass and scale, as something that burst—*a la* the 'Big Bang'—from a tiny point and is still expanding as a result. How then does BBC explain what caused the cosmic microwave radiation to pervade the cosmos?

Initially, BBC theorists posit, a nascent cosmos emerged from the Big Bang as energy only. This means that the mass of billions of galaxies appeared at a tiny point in the form of an equivalent amount of energy. How then did *matter* appear? Experiments in subatomic physics prove that energy converts to matter via Einstein's famous $E=mc^2$ equation in reverse. Big Bang theorists thus aver that part of the energy released in the Big Bang began congealing as matter, *but not as matter only!*

In sub-atomic physics, if half of any given amount of energy forms a particle of matter, the other half must form a matching particle of antimatter, i.e., a particle manifesting equal mass and opposite charge. *Protons*, for example, co-appear with *antiprotons*, *electrons* co-appear with *positrons*. Once formed, protons, e.g., that encounter other protons repel them, but protons that encounter antiprotons *co-annihilate* with them, converting the total mass of both particles back to energy. According to Big Bang logic, cosmic microwave radiation is a residue of energy released by the co-annihilation of massive quantities of matter and antimatter following the Big Bang.

To throngs of scientists and lay readers of scientific journals, the above makes sense. In fact, both premises merit scrutiny. I will now explain:

1. **Why BBC's attempt to account for the cosmic microwave radiation fails.**

Converting energy to matter requires physicists to arrange for already existing matter—highly-energized protons—to collide head-on, as in a cyclotron. What happens when protons collide?

When protons collide, however forcefully, the propensity of positive charge to repel positive charge lessens the impact for the protons themselves. The same cannot be said for the energy 'bundles' impelling the protons toward each other. Energy 'bundles,' lacking a propensity to

avoid collision, meet head-on at full force. When that happens, it is part of their fused energy that converts readily to particle-antiparticle pairs. Apart from a causal mechanism such as a cyclotron, protons simply do not rush at each other on their own. Alas, no cyclotronic mechanism existed in the energy-only Big Bang, a posited phenomenon wherein everything by definition rushed outward on diverging radii, allowing nothing to collide head-on, let alone at high speed.

Indeed, BBC's view of the cosmos as point-generated engenders a further list of major problems, each of which renders BBC's starting premise suspect. In succession:

2. BBC's co-annihilation model necessitates violating conservation of charge.

Just as the *formation* of a given mass of matter requires the formation of an equal mass of antimatter with opposite charge, so also the *annihilation* of a given mass of matter with a given charge requires the annihilation of an equal mass of antimatter with opposite charge. Alas, in BBC's co-annihilation model, an entire original mass of antimatter vanishes leaving the matter that forms the cosmos fortuitously intact with all its opposite charge preserved. To justify this law-shattering anomaly, BBC theorists posit a strange thing they call 'charge parity *asymmetry*,' a euphemism for charge parity *violation*. Mix a billion times as much matter as now exists with an equal mass of antimatter and lo! One billionth of the matter will somehow remain though every single billionth of antimatter converts to energy. (See *Origins*, N. Tyson & D. Goldsmith, New York: W. W. Norton & Co., 2004, pp. 41-43, and many other BBC-affirming publications)

Claims that particle accelerator tests affirm nature as infinitesimally biased in favor of matter over antimatter can be disregarded because: 1) The measurements are too minute to be trusted. Did anyone really count 1,000,000,000 positron tracks in a bubble chamber, followed by a separate count yielding 1,000,000,001 electron tracks? I don't think so. 2) The fact that Big Bang theory, to be credible, *must* impute the above bias to nature warns that the real bias lurks elsewhere. 3) A better option begs recognition.

3. BBC's point-initiated fireball yields hydrogen and helium *atoms* to the exclusion of hydrogen and helium *ions*!

Astronomers find that hydrogen (H) and helium (He)—the two lightest elements—comprise most of the mass in the cosmos. They find also, curiously, that H and He *ions* outnumber H and He *atoms* by at least nine to one! Protons and electrons comingled in BBC's point-initiated fireball had plenty of time to find each other, resulting in *atomic* H and He exclusively. How then, during the last dozen or so billion years, did 90% of BBC's primeval electrons and protons get wrenched away and kept away from each other, leaving most of BBC's H and He ionized?

This is a major question for a little-known reason. *Atomic* H and He are *opaque*! Stars shine as freely as they do because some 90% of the H and He in them is *ionized*, hence *transparent*! By contrast, BBC's early stars somehow had to shine through opaque gas. Ergo BBC starts the cosmos with the wrong kind of star fuel—a kind that drastically *inhibits* stars from shining at all!

Did an awesome force really have to wrench 90% of already-bonded protons and electrons apart and keep them apart over the last dozen or so billions of years? Or—as BBC theorists fail even to consider—could it be that 90% of the H and He in the cosmos was ionized from the beginning?

So—BBC’s initial stars consisted of and were embedded in clouds of *atomic* hence *opaque* H and He. That is why BBC theorists dub that early period “the dark era.” But—BBC’s first stars were also large enough to emit *UV* energy. That UV energy in turn removed light-blocking electrons from more and more H and He atoms, changing them into transparent H and He ions. Thus a so-called “era of decoupling” ended BBC’s “dark era.”

Where, though, did BBC’s expelled electrons go? With new-formed stars expelling electrons amid embedding clouds of as-yet atomic hence unwelcoming H and He, expelled electrons had only the interstellar spaces to loiter in. That is ironic, because BBC theorists aver that their very large hence short-lived UV stars, bursting as supernovas, spewed clouds of their freshly ionized H and He gas out into the same interstellar space where swarms of recently-expelled electrons, no longer bullied by UV energy, were free to reunite with lonely protons swarming in the nebulae! Alas, BBC’s “era of decoupling” could only segue to an “era of *recoupling*.” The *‘makings’ for generations of later stars thus remained just as atomic and hence just as opaque as before!*

If *attenuated* opaque gas *outside* the UV stars sustained a ‘dark era’ for a hundred million years despite intense UV energy, surely *dense* opaque gas *inside* the UV stars would have dammed up BBC’s posited UV energy enough to cause those same UV stars to nova even before their opacity problem was supposedly solved. If so, both the ejected nebulae and the embedding gas inevitably remained *both atomic and opaque!*

BBC theorists are counting on NASA’s 787 billion dollar James Webb Space Telescope (JWST), due for launching in the next few years, to confirm the above BBC scenario. As Jonathan Gardner, a “top Webb scientist,” reports, “We are aiming to see the realm between 250 million years after the big bang to about 400 million years afterward [i.e., the approximate span of BBC’s ‘era of decoupling’].” The goal, Gardner explains, is to test the theory that the first galaxies were composed of “very large, very bright and short-lived stars” (Mark K. Matthews and Robert Block, “If Scope Flies, Expect Awe,” *Orlando [FL] Sentinel*, August 8, 2010, p. A1).

This is exactly what *must* be proved to establish BBC as factual! I confidently aver that NASA’s Webb telescope will find the earliest stars to have been more or less identical to the very old, not unusually bright, very long-lived stars observed in elliptical galaxies and globular clusters today!

4. BBC fails to explain what kept the Big Bang from favoring deuterium over hydrogen.

Just as BBC’s primal mix of protons and electrons guaranteed a cosmos sated with *atomic* rather than ionized hydrogen, so also BBC’s primal mix of protons and neutrons assured a cosmos sated with *heavy* hydrogen, i.e. deuterium. Just as protons attract electrons, so also protons and neutrons attract each other, albeit only at a closer range. BBC—positing protons and neutrons as intermixed in a post-big bang fireball—unwittingly guaranteed a vast preponderance of deuterium. Alas, the opposite is true—hydrogen predominates massively over deuterium in the cosmos at large. Why?

5. BBC reduces gravity to a force in need of fantastical aid.

Obviously if all the mass in the cosmos once filled a space as small as a walnut, gravity would have precluded cosmic expansion by vacuuming the ‘walnut’ into a black hole. Even if expansion somehow occurred, gravity’s sustained extreme pressures would have *fused* much of the atomic H and He into heavy elements, making them incredibly more prevalent than they are observed to be. As all cosmologists agree, heavy element began forming in supernovas ages *after* the Big Bang.

Enter Alan Guth and ‘hyper-inflation.’ Hyper-inflation, we are told, jointly counteracted gravity and thwarted premature heavy element production by expanding space-time itself *at 10^{45} times light-speed!* Moments later all that accelerated mass braked far below light speed! Gravity and conservation of momentum thus join conservation of mass and charge on BBC’s list of variable laws. Alas, hyper-inflation, by thwarting gravity when it was ‘too strong,’ *left it too weak later!*

Gravity works best with cold *heavy* elements. Gravity is at its weakest if very hot H and He are the main players. Gravity is even less likely to form stars from BBC’s *hyper-dispersed and very hot* clouds of H and He. Yet stars formed from it! Gravity even pulled dispersing stars together as galaxies and then even herded initially dispersing galaxies together as clusters. Some galaxies veered enough to collide! Gravity arranged dispersing galactic clusters as *walls!* Hyper-inflation left gravity too weak to do all this, ergo *something*, BBC analysts find, *must be aiding gravity.*

Did *magnetism* aid gravity? At short range, magnetism outperforms gravity as a mass compactor—*provided the mass is ionized!* Alas magnetism emerges when ions are present, but BBC endows the early cosmos with *atoms only!* Hence BBC proponents call up something called ‘dark matter’ as a steroid for gravity. A few grams of steroid enhance athletic prowess on earth; but for dark matter to aid gravity adequately, *70 percent or more of the mass of the entire cosmos has to consist of dark matter!* Surely anything with that much mass must be detectable, but, no, dark matter is undetected. How odd, by the way, that matter and antimatter must appear together but no one ever posits dark matter necessitating the co-appearance of *anti-dark matter.*

6. BBC’s ‘Dark Energy’ Issue

As noted, BBC launches cosmic expansion at the speed of light times 10^{45} followed by a sudden deceleration to sub-light velocity. Now that we know cosmic expansion is *accelerating*, BBC must juggle the two *hypothetical* expansion rates it cannot prove with an *actual* expansion rate it failed to predict. BBC offers ‘dark energy’ as causing the current acceleration but offers no tie-ins between its purported hyper-inflation and ‘dark energy.’

7. BBC’s Globular Cluster/Halo Star Issue

In BBC, globular clusters and halo stars derive from the same gas clouds that birthed galaxies. Let’s test that notion. Entities derived from a common source tend to share angular momentum on a common plane, just as stars in our part of the disk of our own galaxy, despite their individual motions, circle the galactic center once every 225 million years (1 galactic year). Stars in galactic nuclei move much more randomly, yet even they “have some net rotation about the galactic center,” (Chaisson & McMillan, *Astronomy Today*, 3rd ed., NJ: Prentice-Hall, 1999, p. 529; see also 6th ed., 2007). Halo stars and globular clusters, however, orbit galaxies at much more unique angles. This suggests that globular clusters and halo stars *formed apart from galaxies and were added later*, a possibility BBC precludes.

8. BBC’s Excess Energy Issue

Astronomers find that radiation from stars birthed amid opaque nebulae, coupled with a solar wind emitted by the stars, combines to *push the remaining opaque gas away* often at high velocities. BBC theorists fail to grasp how this fact affects their theory.

Tyson and Goldsmith, in *Origins*, cited above, aver on page 51 that if our Sun and a same-mass anti-star co-annihilated, the energy released would temporarily exceed the output of “*all the stars of 100 million galaxies*”! Try to imagine, then, how much the radiation pressure resulting from that cataclysm would rend the remaining opaque gas if one star/anti-star pair co-annihilated inside an opaque nebula! Yet both authors endorse BBC’s claim that mass equal to 2 billion universes, one of antimatter and one of matter, co-annihilated in the Big Bang! Surely the energy released by that great a cataclysm would have laser-blasted BBC’s surviving billionth of opaque H and He far, far, far out into the void, at least at half the speed of light! Even after Guth’s fanciful hyper-inflation ceased, that much radiation pressure alone would still be keeping BBC’s surviving billionth of its unavoidably opaque gas dispersing at a pace far surpassing the present expansion rate of the entire cosmos! How could this not be true if a Big Bang really happened?

9. BBC’s Cosmic Background Radiation Issue

The fact that the cosmic background radiation (CBR) is approaching us omni-directionally attests that it originated not at a point as BBC posits, but on some sort of plane that totally encompasses the entire visible cosmos.

I submit that these eight BBC flaws are not ‘straw men.’ They are extremely problematic. I request an opportunity to present them to a scientific committee along with what follows.

If not a Big Bang, then what?

Now to my alternative to Big Bang Cosmology. For reasons not explained here, I call it *Harmonic Origin Cosmology* (HOC). HOC corrects every flaw in BBC’s point-generated model by positing quark/anti-quark pairs appearing side by side (a million or so per square millimeter) everywhere on *an immaterial multi-billion-light-year-wide spherical plane* in pre-existing space. Call it a *sphere of origin* (*orisphere* for short). Even as quarks split from anti-quarks, sets of the former combined as neutrons, sets of the latter fused as antineutrons. Neutrons sped *inward* from the orisphere at Velocity X, antineutrons sped *out* at the same rate, resulting in two concentric oppositely-spinning hollow globes. Matter/antimatter co-annihilation had not yet begun, hence matter was cold, making it more manageable to gravity once gravity began to manifest its presence. By contrast, when matter is super-heated, as in BBC’s fireball, the rapid motion of energized particles makes them more resistant to gravity’s pull.

As the neutron globe compacted over time—*accompanied by an initial contraction of space inside the orisphere*—conservation of momentum *increased its rate of spin*. Eventually its spin grew rapid enough to hurl matter back out toward the by then distant orisphere. At that same time, the initial contraction of inner space also maxed and reversed, leading to the accelerating cosmic expansion we observe today! The matter domain’s initial *compacting planar era* thus segued to its present *expanding distributed era*. Gravity, aided by that inward compaction plus the initial contraction of inner space itself, easily coalesced *cold* matter as stars, globular clusters and galaxies sans dark matter as a steroid. HOC gravity had all the help it needed! No wonder dark matter remains undetected—it does not exist! HOC’s current accelerating expansion of inner space likewise accounts for dark energy. But if matter and antimatter separated that tidily, how does HOC explain the origin of the cosmic background radiation? Shelving that question momentarily I turn to a more pressing one:

Why choose neutrons and antineutrons as first particles? Protons, electrons and their antimatter counterparts are essential. Shouldn't they be there at the outset? No, and here's why: Neutrons bereft of protons manifest a 12-minute half-life. Given a 12-minute span, half of any number of "free" neutrons splits into three components: a proton, an electron and a neutrino. Now you see why a "neutrons first" origin provides exactly what is needed to make H and He the most plentiful elements in the cosmos. Provided neutron breakups happen on a plane rather than massed around a point, ionized hydrogen will predominate over atomic hydrogen and deuterium both!

"Neutrons first" assures plenty of *ionized* H and He! Protons, electrons and neutrinos—released randomly on, above and below the matter plane—moved *at different velocities!* Nearly massless neutrinos vanished almost at light speed. More on them later. While protons—1836.12 times as massive as electrons—dawdled on or near the plane, swift electrons were departing from the plane at all angles. The only electrons captured by protons were the 10% or so that bursting neutrons emitted at low angles, i.e. on or close to the matter plane. The other 90% or so sped off above or below plane, leaving the remaining 90% of the protons to form *ionized hence transparent* H and He! By contrast, if protons and electrons had been *intermingled* while still stationary relative to each other and the matter plane, opaque atomic H and He would have been the exclusive result.

Most newly released protons moved *off* plane as hydrogen. The few that stayed on or close to plane, making contact with still intact neutrons, were the few that became deuterium, and in some cases, tritium, leading potentially to the formation of helium, the second commonest element.

H becomes He when some protons bond with up to three still-intact neutrons, forming deuterium, tritium and helium in that order. Especially during its first 30 minutes, an HOC cosmos indeed had enough neutrons to facilitate the triple bonding that changed some of the H to He.

Now you know why HOC—by solving BBC's onerous early opacity problem—needs no special UV stars. Nor does HOC violate charge parity or have the slightest need for hyper-inflation, dark matter, dark energy or a 'dark era.' Still, how does HOC explain cosmic background radiation?

Recall that 50% of electrons and neutrinos randomly released by neutron decay sped *in* from the neutron globe, 50% sped out. Positrons and antineutrinos emitted by antineutron decay on the outer globe likewise separated; 50% sped in, 50% sped out. Velocity X—by separating matter and antimatter from the orisphere and from each other—kept electrons and positrons apart despite their velocities. Neutrinos and anti-neutrinos, moving almost at light speed, were another matter! Meeting in co-annihilation, *they* became the source for cosmic background radiation. Note how HOC's explanation for cosmic background radiation resolves BBC's excess energy problem. Why annihilate two billion entire universes when neutrino/antineutrino annihilation suffices? HOC also explains why cosmic background radiation reaches us omni-directionally; *its source entirely encompasses this inner part of the cosmos!*

Given HOC's account of how most protons were left ionized, how does HOC also explain what kept most protons and electrons apart *even after all these subsequent billions of years?* I reply: electrons leaving the *inside* of the neutron globe took billions of years to cross a vast, empty inner space. No electrons ended up pooled among early stars, waiting to reunite with protons in nebulae ejected when early stars exploded. Not until *long-lived* stars consisting of approximately 90% ionized H and He began exploding as supernovas ages later did electrons arriving from the far side

of the long-ago neutron globe get to combine at last with protons, transforming more and more by-then heavy element ions into atoms preparatory to planet, comet and moon-making.

Summarizing the main Points of Harmonic Origin Cosmology

Just as space-time is now expanding, bearing *a mature cosmos* along at an accelerating rate, HOC posits *contracting* space-time, beginning 13 billion or so years ago, helping Velocity X *compact* a newborn cosmos enough for *both magnetism and gravity* to be able to clump cold masses of H and He as stars, globular clusters and galaxies! *No dark matter was needed*; convergence sufficed! Nor did the contraction crunch matter to a point. By the time inbound globular clusters, galaxies, dwarf galaxies and halo stars neared the cosmic center in that order, four events occurred:

1) *Six billion years ago that initial contraction, slowing by then, reversed.* 2) The conserved angular momentum of matter in that space, aided now by an *expansion* of space itself, hurled globular clusters back out to be caught by still inbound galaxies. 3) Expanding space—again in concert with conserved angular momentum—next flung billions of *galaxies* back out toward the orisphere. En route, they swept up still-inbound halo stars just as they had captured flung-out globular clusters earlier. *That* is HOC's theory as to why globular clusters and halo stars do not share the orbital momenta of host galaxies as do the stars in galactic disks. 4) What BBC calls 'dark energy' is simply HOC's six-billion-years-old space expansion still accelerating today!

Whereas BBC's primordial 'ion dearth' left magnetism 'sitting on the bench' in the early cosmos, HOC's primordial ions gave magnetism a major early role in star and galaxy formation. This occurred very logically in ways I am ready to explain, but not in this brief paper.

What about that all-encompassing external antimatter domain? I reply: while the matter globe was enjoying six billion years of gravity-and-magnetism-assisting *compaction*, antimatter was subject to an equal era of gravity-weakening *expansion, expansion and more expansion*. Hence antimatter probably exists as little more than ionized plasma far outside the matter domain.

As a curious aside, Genesis actually describes the cosmos as plane-launched rather than point-initiated. It even describes a plane as serving to separate perhaps equal masses of something *under* plane from a visibly identical entity *above* plane. I quote: "And God said, 'Let there be an *expanse* between the waters to separate water from water.' And so God made the expanse and separated the water under the expanse from the water above it' (Genesis 1:6, 7). Let the two categories of 'water' typify a neutron plasma that is visibly indistinguishable from an antineutron plasma and you have exactly what HOC posits as the way the cosmos began.

Reader response will be so appreciated! Please help me win 'a day in court' for this new and far more logical cosmology.

Don Richardson

Readers are invited to reply to: unhidden22laws@gmail.com

Copies of the latest edition of *UNHIDDEN* are available only at www.donrichardsonbooksales.com.