

Planck's Blackbody Radiation and Early Mature Spiral Galaxies

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Abstract

Guided by Einstein's 1916 paper on the statistical approach to atoms interacting with photons, in which he rederived Planck's blackbody radiation formula and provided a foundational understanding for Heisenberg to develop his matrix quantum theory, we shall apply Einstein's methodology to the Planck era of the early universe. We begin by proposing that the Planck universe consisted of high-temperature, compacted gravitons in thermal equilibrium with photons. We further propose that these gravitons were able to be excited into higher energy states through photon absorption or to spontaneously decay into lower energy states by emitting discrete amounts of energy in the form of photons or as rotational energy. Due to the uniformity and sameness of the compacted Planck era spacetime, such emitted energy rotations could only rotate unidirectionally. However, we argue that at some statistical energy saturation point, a cascade event occurred, resulting in these excited gravitons emitting vast quantities of photons, elementary particles, together with rotational energies. As spacetime grew exponentially, so too did the entropy of the universe, allowing the microscopic spacetime vortices to be emitted bidirectionally in rotation. As particle accretion began and the first spiral galaxies formed with unidirectional rotation, they did so in greater numbers than bidirectional spiral galaxies formed later during the exponential increase in spacetime entropy. It is this recently observed bias in galactic rotation and formation of early mature galaxies that we shall investigate in this paper.

Keywords

Galaxy Rotational Bias, Graviton Emission and Absorption, Astrophysics, Statistical Mechanics, Einstein, Quantum Physics

1. Introduction

Guided by Einstein's 1916 statistical paper on the interaction between atoms and

photons [1], we apply an analogous methodology to the Planck era of the early universe. This initial period of spacetime we assume to be comprised of high temperature, extremely compact gravitons in thermal equilibrium with photons. In this way, we are re-deriving classical thermodynamics from statistical relativistic mechanics. It is further proposed that these excited gravitons undergo spontaneous emission and absorption of photons [2]. This idea is supported by recent publications on the observed cosmic graviton background (CGB) [3]-[6]. Furthermore, as Einstein predicted that atoms could also undergo stimulated emissions, we assume gravitons, during the Planck era, do as well. The difference between stimulated emissions for atoms versus gravitons is that gravitons emit microscopic amounts of discrete rotational spacetime energy (*rather than two identical photons, as Einstein hypothesized with atoms*). Due to the uniformity and compactness of the Planck era, we surmise nearly all such vortical energies rotated in the same direction. See **Figure 1** immediately below.



Figure 1. Excited graviton emitting rotational spacetime energy. The sum of which resulted in early spiral galaxy formation having a bias in rotational direction opposite to the Milky Way galaxy.

At some statistical point, during the Planck era, photon absorption spiked, causing excited gravitons to suddenly undergo a cascade event of energy release. During this thermodynamically balanced process, discrete graviton emission energy was converted into photons, elementary particles, and rotational spacetime energies. Correspondingly, the universe grew exponentially in size. During this expansion, two important consequences occurred. First, at some point in the expansion, elementary particles began to accrete while interacting with the energy vortices that acted like a catalyst during spiral galaxy formation. The result was the production of earlier than expected mature spiral galaxies [7]-[9]. Furthermore, during the expansion of the early universe, entropy grew exponentially large, allowing for the emitted rotational spacetime energies to emerge in either one of two directions. This overall effect was to form bidirectional spiral galaxies, which presently,

the James Webb Space Telescope (JWST) Advanced Deep Extragalactic Survey (JADES), observed in its field of view. It was discovered that a majority of spiral galaxies rotated in a clockwise direction, opposite the Milky Way galaxy, while the minority rotated in the direction of the Milky Way galaxy. A rotational bias not predicted by current cosmological models [10].

2. Mathematics of Photon and Graviton Energy Exchanges

As was generally true with Einstein's scientific endeavors, when he applied a statistical approach to atoms in thermal equilibrium with photons, the result was far more than a solution to a problem, it provided a deep connection and understanding between Planck's blackbody radiation and Bohr's atomic model, eventually leading Heisenberg to develop a quantum matrix theory, as well as becoming the theory behind the invention of lasers. The purpose then is to apply Einstein's statistical approach to the early universe during the Planck era, in hopes it might answer two things. Why spiral galaxies formed far earlier than theory had predicted [11], and why spiral galaxies overall showed a preferred direction of rotation opposite to the Milky Way galaxy rotation? Both cosmological phenomena were observed by the James Webb Space Telescope Advanced Deep Extragalactic Survey (JADES) [12].

We begin by applying an analogy to Einstein's statistical methodology to the Planck era of the early universe. Instead of considering atoms in thermal equilibrium with photons at high temperature, we instead applied compact gravitons interacting with high-temperature photons to the Planck era of the early universe. We assumed Planck gravitons behaved very much like atoms, in that they too absorbed and emitted photons.

To express the energy exchanges between gravitons and photons in thermal equilibrium in mathematical form during the Planck era, we begin by considering two energy states E , where $E_j > E_k$. Letting N represent the total number of gravitons comprising the early universe during the Planck era, and N_j to be the total number of gravitons in a given energy state j , the probability W_j of gravitons in state j may be written as: $W_j = \frac{N_j}{N} = p_j e^{-\frac{E_j}{\kappa T}}$, where we assumed a Boltzmann distribution. Here E_j is the energy in the state j , T the temperature of Planck era in the early universe, and κ represents the Boltzmann constant. Where p_j is some statistical weight allowing atoms to have the same degenerate state. Therefore, the number of gravitons in a given state may then be

written as $N_j = N p_j e^{-\frac{E_j}{\kappa T}}$. The next step is to calculate the transition rate. Einstein considered spontaneous emission rate to be proportional to N_j , such that:

$\frac{dN_j^{spe}}{dt} = -A_{jk} N_j$, where A_{jk} is a proportionality constant indicating a transition from state j to state k . The minus sign indicates the number of excited gravitons in that state during emission, decreases. Whereas the greater number of

gravitons there are, the faster the rate of emission occurs—analogue to radioactive decay.

Absorption of radiation by gravitons is very similar to emission, except the process is reversed. And so the graviton energy level is raised from the lower state k to the higher state j , hence $E_j > E_k$. The rate of this energy exchange is proportional to the number of gravitons in energy level k , as well as the radiation density $\rho(\nu)$. The transition rate at which this happens is given by:

$$\frac{dN_j^{abs}}{dt} = B_{kj} N_k \rho(\nu), \text{ where } B_{kj} \text{ is the new proportionality constant, indicating}$$

a transition for state k to j . Assuming dynamic equilibrium, the total transition rate will be the sum of these two transition rates, such that:

$$\frac{dN_j}{dt} = \frac{dN_j^{spe}}{dt} + \frac{dN_j^{abs}}{dt} = 0. \text{ This means the number of gravitons in state } j \text{ re-}$$

mains constant. And so, as one graviton loses energy, another gains energy from the radiation field. By substitution, we have: $-A_{jk} N_j + B_{kj} N_k \rho(\nu) = 0$. Solving

for energy density yields: $\rho(\nu) = \frac{A_{jk}}{B_{kj}} \frac{N_j}{N_k}$. From above $N_j = N p_j e^{-E_j/\kappa T}$, to-

gether with $N_k = N p_k e^{-E_k/\kappa T}$ yields: $\frac{p_j A_{jk}}{p_k B_{kj}} e^{-(E_j-E_k)/\kappa T}$ with $\frac{A_{jk}}{B_{jk}} = \frac{8\pi h \nu^3}{c^3}$ and

where $E_j - E_k = h\nu$, leads to directly to Wien's Law:

$$\rho(\nu) = \frac{8\pi h \nu^3}{c^3} e^{-h\nu/\kappa T} \tag{1}$$

Einstein realized, as we are for the early universe, close to calculating Planck's radiation law. Next, he assumed that an atom could undergo stimulated emissions and we assume gravitons can do the same, in which he wrote as:

$$\frac{dN_j^{(ste)}}{dt} = -B_{jk} N_j \rho(\nu). \text{ The minus sign, as before, indicates the atom at higher}$$

state j emits a photon leaving the atom in the lower energy state k . Here B_{jk} is the new proportionality constant for stimulated emission. By including stimulated emissions with radiation in thermal equilibrium with atoms, where have for gravitons, and solving for radiation density, leads to the following relationship:

$$\rho(\nu) = \frac{A_{jk}/B_{jk}}{\frac{B_{kj}}{B_{jk}} \frac{N_k}{N_j} - 1} = \frac{A_{jk}/B_{jk}}{\frac{p_k B_{kj}}{p_j B_{jk}} e^{(E_j-E_k)/\kappa T} - 1} = \frac{A_{jk}/B_{jk}}{e^{(E_j-E_k)/\kappa T} - 1} \tag{2}$$

At the high temperature implied: $\frac{A_{jk}/B_{jk}}{\frac{B_{kj}}{B_{jk}} \frac{N_k}{N_j} - 1} \rightarrow \infty \Rightarrow p_k B_{kj} = p_j B_{jk}$. Again, we

substitute in certain relationships as we did above for Wien's law. In doing so, just as Einstein had rederived Planck's blackbody radiation formula, as we have for the early universe Planck era:

$$\rho(\nu) = \frac{8\pi h \nu^3}{c^3} \frac{1}{e^{h\nu/\kappa T} - 1} \tag{3}$$

By replacing atoms with gravitons, and assuming they too can absorb or emit discrete states, and applying a statistical approach to these energy states produces Planck's black body radiation formula. This result indicates the early universe in its hot dense state, behaved like a perfect blackbody. This was confirmed in part by Planck and WMAP Satellites, which made extensive observations of the 2.7 cosmic microwave background radiation [13] [14].

More is required to answer the two cosmological questions of: Why spiral galaxies formed far earlier than theory had predicted, and why spiral galaxies overall showed a preferred direction of rotation opposite to the Milky Way galaxy rotation?

3. Lagrangian Development for an Early Universe Metric

In this section, we develop a Lagrangian representing the spacetime of the early Planck era universe, which we assume is comprised of oscillating gravitons. To construct a spacetime metric function $g_{\mu\nu}$, we consider a classical Lagrangian representing a system of graviton particles vibrating about a point of equilibrium during the Planck era of the early universe.

$$L = \frac{1}{2} (T_{ij} \dot{\eta}_i \dot{\eta}_j - V_{ij} \eta_i \eta_j) \quad (4)$$

where the η_i 's represent small deviations from the generalized coordinates q_{0i} , and are expressed by the following equation: $q_i = q_{0i} + \eta_i$. The η 's subsequently become the generalized coordinates for the equations of motion, given by:

$$T_{ij} \ddot{\eta}_j - V_{ij} \eta_j = 0 \quad (\text{no sum over } i) \quad (5)$$

The preceding second-order differential equation represents a coupled system of particles undergoing simple harmonic motion. The solution has the form of normal coordinates describing a one-dimensional harmonic oscillator:

$$\eta_i = C_\kappa e^{-i\omega_\kappa t} \quad (\text{no sum over } i) \quad (6)$$

To simplify matters, let the coefficients C_κ be set equal to one (along with other small modifications to bring out clarity both mathematically and physically for this oscillating system of graviton particles, but which do not alter the understanding of what is occurring physically). From these normal coordinates, we construct an ansatz spacetime metric $g_{\mu\nu}$. One describes a field of gravitons undergoing simple harmonic motion. That is to say, from the set of simple normal coordinates η_i undergoing harmonic motion, we begin construction of a general relativistic spacetime metric through a vierbein formalism [15], which is as follows:

$$g_{\mu\nu} \equiv \eta_\mu \cdot \eta_\nu = e^{i\omega t} \delta^\mu_\nu = e^{i\omega t} \eta_{\mu\nu} \quad (7)$$

Assuming discrete energy emissions and absorptions, we have:

$$g_{\mu\nu} = e^{i\omega t} \eta_{\mu\nu} \rightarrow e^{n(i\omega t)} \eta_{\mu\nu} \quad (8)$$

Note, when $n=0$, or when $n(\omega t) = m\pi$ (where n and m are natural

numbers), the metric reduces to flat Minkowski spacetime, implying throughout Planck era spacetime, nodes appear.

4. Calculating the Energy Momentum Tensor

What is interesting about the complex metric we have constructed is by acting on it with the general relativistic equation, results in an energy momentum tensor $T_{\mu\nu}$ that is completely real and calculated to be:

$$G_{\mu\nu} = \left[R_{\mu\nu} - \frac{1}{2} g_{\mu\nu} R \right] \Rightarrow$$

$$T_{\mu\nu} = \frac{nc^4}{16\pi G} \begin{pmatrix} -\frac{3}{2}\omega^2 & 0 & 0 & 0 \\ 0 & \frac{1}{2}\omega^2 & 0 & 0 \\ 0 & 0 & \frac{1}{2}\omega^2 & 0 \\ 0 & 0 & 0 & \frac{1}{2}\omega^2 \end{pmatrix} \quad (9)$$

where $G_{\mu\nu}$ is the Einstein tensor, $R_{\mu\nu}$ is the Ricci tensor and ω is the graviton angular frequency.

Note: Upon further consideration, in our initial development, we came to understand that we had left out an additional degree of freedom in the internal mode energy within the graviton. This was rectified by considering that when a graviton absorbs energy, it forms a standing wave, complete with nodes and antinodes. By applying the wave-particle duality principle to the interior of the graviton, the standing wave becomes a particle trapped in a “box” oscillating back and forth within the interior of the graviton. In quantum mechanics, the energy levels are given by:

$$E_n = m^2 \left(\frac{h}{8mL^2} \right) \quad m = 1, 2, 3 \quad (10)$$

In this way, we are merging the early statistics applied in the development of quantum mechanics, together with general relativity. In doing so, it indicates an additional energy term is necessary to account for the interior energy of the graviton. From equation 10, noting the counting number m is squared, the second energy term associated with the gravitons is given by:

$$E_m = m^2 \left(1.42580 \times 10^{-19} \right) \frac{\text{J}}{\text{grav}} \quad m = 0, 1, 2, 3 \quad (11)$$

The total energy per graviton after absorption of electromagnetic energy, thus converting it into gravitational quanta, is given by:

$$E_{n,m} = (n + m^2) \left(1.42580 \times 10^{-19} \frac{\text{J}}{\text{grav}} \right) \quad (12)$$

Keep in mind light energy quanta $h\nu$ is not the same as gravitational quanta, which have as its constituents, the fundamental constants as: G , c and ω .

Due to the internal dynamics of the graviton, where photon energy is absorbed and converted into an equivalent amount of gravitational energy, we necessarily introduced m^2 and subsequently discovered the restrictive relation given $n + m^2 \leq 104$. Where n and m are counting numbers. This inequality was derived from the mass-energy results measured at CERN and other particle accelerators. Plugging in the largest elementary mass into equation 12 above allows us to determine the aforementioned inequality.

5. Converting Energy Density in Particle Mass

By converting the energy density tensor $T_{\mu\nu}$ into particle mass, we were able to reproduce all elementary particle masses in SI units of the Standard Model of particle physics. The application of SI units is valuable in the sense that it allows one to be more aware of what's going on in other fields of physics. As an example, we tend to use SI units in electromagnetism rather than Gaussian units because the conversion factors are long and tedious and not so familiar anymore. The same with constants being set to unity. Sometimes the mathematical manipulations become easier, but some intuitive sense of what is going on may be lost. Nevertheless, here, we still provide units in electron volts as is the applied case for particle physics.

For example, we next calculate the mass for the Boson particle from the Standard Model of particle physics.

$$\frac{T^{00}}{N_D} = n^2 \frac{\left(\frac{3}{2}\omega_g^2\right)\left(\frac{c^4}{16\pi G}\right)}{1.00 \times 10^{31}} = n^2 \left(1.425801587 \times 10^{-11}\right) \frac{\text{J}}{\text{particle}} \quad (13)$$

where ω_g is the graviton angular frequency [1], where

$$\omega_g = 2\pi\nu_g = 2\pi(1.000000000 \times 10^{-12}) \text{ s}^{-1} \quad (14)$$

with $c = 299792458 \text{ m/s}$ and $G = 6.67428(67) \times 10^{-11}$. Finally, we convert the energy operators into mass generators and apply them to calculate the W-Boson:

$$m_{B_1} = n \frac{E}{c^2} = n(1.586418216 \times 10^{-28} \text{ kg}) \quad (15)$$

$$m_{B_2} = n^2 \frac{E}{c^2} = n(1.586418216 \times 10^{-28} \text{ kg}) \quad (16)$$

Through a superposition principle, we hold that these mass generators are able to produce all n-valued Standard Model particle mass. We calculate the W-boson mass determined by setting $n = 7$ for the covariant mass, and $m = 30$ for the contravariant mass. This leads to the following bosonic results:

$$m_{B_1} = n \frac{E}{c^2} = 7(1.586418216 \times 10^{-28} \text{ kg}) = 1.110492751 \times 10^{-27} \text{ kg} \quad (17)$$

$$m_{B_2} = m^2 \frac{E}{c^2} = 30^2(1.586418216 \times 10^{-28} \text{ kg}) = 1.427776395 \times 10^{-25} \text{ kg} \quad (18)$$

Adding the masses together yields the theoretical W-boson mass value of:

$$1.110492751 \times 10^{-27} \text{ kg} + 1.427776395 \times 10^{-25} \text{ kg} = 1.438881318 \times 10^{-25} \text{ kg} \quad (19)$$

Comparing the theoretical W-boson mass to the empirically measured mass of 80.403(29) GeV/c², as reported in CODATA [16], converted to SI units by applying: 1 GeV/c² = 1.782661845 (39) × 10⁻²⁷ kg, leads to a CODATA W-boson mass of: 1.433 (32) × 10⁻²⁵ kg.

Compared to the theoretical value of Equation (19), the empirical W-boson mass value, the theoretical value is in precise agreement with the observed, experimental value as provided in the CODATA.

6. Spacetime Energy Vortices

In this section, we demonstrate that the energy-momentum tensor $T_{\mu\nu}$ can be arranged to show that gravitons undergo rotational vortical energy densities, which can be emitted during stimulated emissions. Ultimately, these microscopic energies interact with elementary particles as a catalyst in the early formation of spiral galaxies. Also, early on, these vortices are restricted to unidirectional rotations, which leads to such redshifted galaxies to display a preference for rotational direction opposite to the Milky Way galaxy.

First, we define a moment of inertia I , and a matrix form of the graviton angular momentum ω .

$$I \equiv \frac{c^4}{16\pi G} \begin{bmatrix} -3 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$\tilde{\omega}^2 \equiv \begin{bmatrix} \omega^2 & 0 & 0 & 0 \\ 0 & \omega^2 & 0 & 0 \\ 0 & 0 & \omega^2 & 0 \\ 0 & 0 & 0 & \omega^2 \end{bmatrix} \tag{20}$$

These definitions allow us to write the energy momentum tensor in a generalized vibrational kinetic energy density form.

$$T_{\mu\nu} \equiv n \left(\frac{1}{2} I \tilde{\omega}^2 \right) \quad n = 1, 2, 3, \dots \tag{21}$$

This shows that gravitons produce spacetime rotational kinetic energy during and after the Planck Era of the early universe. Further supporting our premise of why early mature spiral galaxies formed. That is to say, these vortical energies acted as catalysts during the accretive formation of spiral galaxies. And also determining direction of rotation for these galaxies.

Note: by estimating the number of particles in early formation of spiral galaxies, observed in the same field of view rotating in the same direction as the Milky Way galaxy or opposite, one can compute various quantities from Equation (21).

$$\frac{n_1 \left(\frac{1}{2} I_1 \omega_1^2 \right)}{n_2 \left(\frac{1}{2} I_2 \tilde{\omega}_2^2 \right)} = 0.5 \tag{22}$$

where I is the average moment of inertia, ω the average angular velocity and n the average number of particles, associated with either rotation in the same rotational direction or opposing direction to the Milky Way galaxy. The number 0.5 is the approximate ratio of spiral galaxies observed rotating in the same direction as the Milky Way galaxy, divided by those mature early spiral galaxies rotating in the opposite. Where the summed initial and final angular momentum $L = I\omega$ may be computed from Equation (22) for instance:

$$L_2 = 2 \frac{n_1 \omega_1}{n_2 \omega_2} I_1 \quad (23)$$

We note that the covariant and contravariant energy momentum tensors are conserved:

$$T^{\mu\nu}{}_{;\nu} = T_{\mu\nu}{}^{;\nu} = 0 \quad (24)$$

The consistency condition [17] expressed by Equation (23) validates our approach, inasmuch as James Clerk Maxwell's approach revealed that Amperes' law was incomplete, hence the four electromagnetic equations were not consistent until he added a single term to Amperes' law. Upon doing so, he was the first to realize that light was comprised of oscillating magnetic and electric fields propagating through space at the speed c . Analogously, our approach is validated by assuming the Planck era in the early consisting of gravitons interacting with radiation, wherein energies are exchanged between gravitons and photons during spontaneous absorption and emission, and through stimulated emissions of rotational spacetime energy.

7. Conclusions

To understand why spiral galaxies had matured beyond what was expected in the early universe, or why it was observed that the greater a spiral galaxy was redshifted, the more likely the galaxy exhibited a rotational bias opposite to the Milky Way galaxy [18] [19], accordingly, we decided to approach the problem from two different angles. First, we applied statistical mathematics to the Planck era of the early universe, which we hypothesized was the first evolutionary stage leading to the expanding universe. One comprised of extremely compact gravitons vibrating in thermal equilibrium with photons. Secondly, we approached the problem from the scientific theory of general relativity, wherein the spacetime metric becomes the foundational entity of its mathematical framework. The metric was constructed from a Lagrangian representing oscillating gravitons to match the spacetime of the Planck era of the early universe. When the metric was acted upon by the general relativistic wave equations, like breaking open a geode, an n -valued energy momentum tensor $T_{\mu\nu}$ was discovered. The energy tensor revealed gravitons contained discrete levels of energy corresponding to both the spontaneous and stimulated graviton emissions occurring during the Planck era. Where stimulated emissions came in the form of vortical spacetime energies, and spontaneous emissions in varying levels of discrete energies, initially came in the form of energetic

photons, then during the expansion of the universe, the emission of photons as well as elementary particles. Together with the mathematics of statistics and the conserved energy momentum tensor, it was clear these vortical spacetime energies acted like a catalyst to quicken elementary particle accretion into amalgams of matter, continuing on until the very first early spiral galaxies formed relatively near to the beginning of the universe. And did so through vortical spacetime energies interacting with dust and elementary particles to produce complex structure spiral galaxies far earlier than ever conceived by any accepted cosmological theory [20].

Because the Planck era was assumed to be made of compact gravitons in extremely hot thermal equilibrium with photons, due to the initial compactness of the early universe, it was assumed that gravitons could only emit rotational spacetime energies in a single direction. However, during the Planck era, a statistical spike occurred during photon absorption by gravitons. A cascade event ensued with a tremendous release of elementary particles, photons and rotational gravitational energy, together spreading out with the expanding universe. Very quickly, the vortical spacetime energies began to interact with vast numbers of gravitationally accreting particles. Not only did energy vortices act like a catalyst in the formation of early very spiral galaxies, but they also passed on rotational energy into the accreting process, which led to the formation of spiral galaxies mostly rotating in the same direction as these early unidirectional spacetime vortices. As the universe continued to expand, entropy increased exponentially, making it possible for gravitons to emit bidirectional vortical energies. Again, spiral galaxies formed, but now, in ever increasingly bidirectional rotations. The combined effect of these two types of rotational spiral galaxies has been observed by the James Webb Space Telescope and analyzed to reveal the existence of a strong bias of spiral galaxies rotating in the opposite direction to that of the Milky Way galaxy to be 50% more in numbers than spiral galaxies rotating in the same direction as our spiral galaxy.

Before closing, we mention two more cosmological matters of some importance. First, we were able to rederive both Wien's Law and Planck's blackbody radiation formula under our graviton scenario, proving, from a general relativistic statistical point of view, verging on quantum mechanics, the early universe was a perfect internal blackbody. Finally, we address one of the most pressing concerns in cosmology, that of the singularity problem [21]. The current acceptable cosmological model entails a singularity at the origin of the universe, in which known physical laws break down. If, however, we assume the universe had no singularity in the past but rather began with the extremely compact Planck era consisting of vibrating gravitons in a state of thermal equilibrium with photons, then the origin of the universe was something very different, something very curious. A kind of crystal structure with infinitesimal random motions internally emitting and absorbing light. The universe did not emerge from a raucous explosion, creating the reality of everything from the infinitesimal world of unreality. Instead, the uni-

verse commenced from a single vibrational crystal-like state, expressing a synergistic, harmonious note, a chorus greater than the sum of its individual components. A world of beauty yet statistical uncertainty.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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