Essay 108: A New Test Of The Quantum Theory

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The quantum theory was proposed by Max Planck in about 1899 in an attempt to explain the failure of the Rayleigh density of states inferred at about the same time. Planck boldly asserted that the energy of an oscillator is not continuous but occurs in integral multiples of a constant h multiplied by frequency f. The constant h became known as the Planck constant. Planck calculated the average energy of an oscillator which can only have energies 0, hf, 2hf, to nhf. This average oscillator energy can be used to calculate the intensity of radiation at frequency f, or angular frequency omega = 2 pi f. This intensity is measured in units of energy per unit area (joules per square metre) and is denoted I. The energy density is denoted U and is measured in energy per unit volume (joules per cubic metre). When integrated over all frequencies the Planck method gave the Stefan Boltzmann law. Planck did not fully realize the significance of his method, which he thought of only as a mathematical trick used to correct the Rayleigh calculation. At about the same time, about 1900, ETH Zurich reluctantly graduated an even more reluctant student called Albert Einstein, who was the first to infer how atoms and molecules absorb and re-emit the quantum of radiation hf. Much later in about 1925 this quantity hf was maned the photon. In 1905 Henri Poincare proposed that the quantum of radiation was a particle with mass, and building on this idea, Louis de Broglie proposed wave particle duality, and “lifted a corner of the veil” as Einstein wrote. Einstein himself proposed in 1905, at almost exactly the same time as Poincare, that this particle has no mass. This was the start of the famous quantum theory, later developed into quantum mechanics, now known to be a limit of ECE unified field theory.

Much earlier, before 1729, Pierre Bouguer proposed the law which describes how intensity decreases exponentially in a material of any kind that absorbs radiation. As often happens in physics his work was attributed to someone else, in this case Johann Heinrich Lambert in 1760 in a book called “Photometria”. Lambert actually quoted Bouguer but the latter was ignored by history until modern scholarship found the truth. In 1852, August Beer made a minor amendment to the Bouguer Law as it should be called. It is always known as the Beer Lambert Law and in the twentieth century it was derived from quantum mechanics using the Fermi Golden Rule. If the initial intensity is I0 and the intensity at a path length Z inside the sample is I, then the law asserts that the ratio of I0 to I decreases exponentially. The exponent contains the product alpha Z, where alpha is the power absorption coefficient. This is a very fundamental law that has withstood experimental testing for nearly three hundred years.

In recent UFT papers it has been shown that the Planck law produces the same ratio I0 / I so it is obvious that the Planck and Beer / Lambert laws can be equated. As often happens in physics the obvious is overlooked, in this case for over a century from 1899 to present. When these two foundational laws of physics are equated, it becomes equally obvious that the frequency of a beam propagating through a sample is continuously decreased as the path length Z lengthens. This is the effect discovered experimentally by Gareth Evans and Trevor Morris in five or six years of careful experimentation at visible frequencies. Their results are reproducible and repeatable and have been replicated in the United State by Denis Davis. Others have reported similar effects experimentally. It was realized in UFT300 and UFT304 that the Evans Morris effects must be accompanied by splitting of the absorption line, because the integrated power absorption coefficient depends on the transition dipole moment and the latter is different for each set of relevant quantum numbers.

In UFT306 just completed it has been shown that a very large number of splittings can occur of the spectrum of atomic H. The red H alpha line of the Balmer series splits the probe frequency into three when the probe radiation is linearly polarized, and in to five when the probe radiation is left circularly polarized. All frequencies are decreased, they are all red shifts. This is a fundamental prediction of the Planck distribution itself. If a probe laser is tuned to the red line of atomic H, it is absorbed at its initial frequency. Three different frequencies should emerge from the sample and these can be looked for experimentally with high precision. If they are not found the Planck distribution is refuted after more than a century. The red line of H is usually thought of as one emission line at the same frequency as the absorption, but in view of the Evans Morris effects and the Planck theory itself, this line can be shifted and split.

Equating the Planck law for I0 / I and the Beer Lambert law for I0 / I immediately gives the cosmological red shift, which is well known to be observable experimentally. It becomes obvious that it is not due to Big Bang. The latter is incorrect due to neglect of torsion.