The (Non-)Mixing of Theories and Time Flow

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Randomness or hidden order can not be distinguished in our physical reality (in the range of measurement, data and information). In the other words: we can not decide between the no-law reality (physical, subjective) and super-determinism (mathematical, objective, without physical quantities [1]). However indeterministic and deterministic theory cannot be combined.

The causes of any non-linearity (subjectivity) are multipoles. If all these poles are identified (resolved) then linear (deterministic) behaviour (treatment) is possible. Without this identification, one can not say that observed non-linearity (chaos, randomness) is fundamental until the "hidden" linearity (order, determinism) is "found".

The classicality bound of the photon-number statistics presented in [2]

$$p_n \leq \exp(-n) \frac{n^n}{n!} = p(\lambda = n)$$

is (correctly) an immoderate limiting factor (more strict than squeezing or oscillatory photon-number statistics, which are interpreted as purely quantum effects). Nevertheless the quantum ("non-classical") behaviour – like the particle bunching/antibunching (super/sub-Poissonian statistics), squeezed states etc. – is not often observed directly (by a single photon number resolving detector). The direct observation of quantum jumps of a trapped ion supports only Poissonian (shot-noise) statistics (as for Geiger counters) and burst noise (with Poisson distribution) for ion states. We can see that correlation measurements (with two ion sources, two detectors and a beam splitter) suggest a presence of "antibunching". However, the correlation/uncorrelation/anticorrelation in detection is not related to statistics of source(s). It is related to mixing (interference, beam splitter) properties and it can be interpreted solely classically (like Hanbury Brown and Twiss effect). Also the squeezed state noise is often not observed directly (although it could be, because the noise of detection can be small enough). It is observed (by homodyne detection with two detectors) after combining the "classical light" (LO) with the "squeezed coherent state" on a beam splitter (and the shot-noise level of an individual beam is not studied). It offers an explanation that this is a misinterpretation (to introduce "non-classical" states). And moreover, the bunching/antibunching properties can be created artificially (by a pulsation, a chopping or a selection of source shape; together with a trigger level combined with an averaging over various phases).

The Poisson distribution (often observed in experiments such as quantum jumps) is (linearly) additive in λ, however any kind of non-linearity in system leads to a non-Poissonian distribution and thus there always exists some n in (normalized) distribution for which this condition mentioned above is infringed (i.e. the "non-classical" state). This non-linearity is not present (observed) only for the electric field vector E (dipole or "spin 1/2") or the single

(fundamental) dipole in the vacuum. But any environment (or detector material) is slightly non-linear (chaotic multipole, multiparticle) and thus this condition excludes any kind of classicality (in this quantum interpretation). Nevertheless non-linearity can not be interpreted as non-classical. It is similar to a misconception such as for the perihelion shift in general relativity. The effect of other (multiple) planets is stated (but not correctly) that it is not a general relativity phenomenon. However all causes must be (in the relativistic interpretation) space-time curvature effects (relativistic − non-linear − multipole effects [3]). We have to concede that any kind of physical law can not be derived (purely) from mathematics. It is an interpretation − classical source, quantum field or relativistic metric. The measured results are (mathematically) equivalent and these (physical) interpretations are only an internal "philosophical competition" in our science (physics). And these representations can not be mixed in any point (such as "erroneous" results (interpretation) in the Bell's inequality experiments for a mix of "classical physics" (electromagnetic field) with photon (quantum) existence). All things are exclusively "classical" (source) or "quantum" (field) or "relativistic" (metric). The correct consistent interpretation must exclude all senses from other interpretations − thus physical experiments can not decide between two interpretations (or prove/disprove one of them) − i.e. any correct interpretation must be fundamental.

It is not so surprising that a laser (or other) source structure, which is efficiently producing a "directional" beam (due action of surrounding atoms) from a wave, diverging (from each excited "single"/"independent" atom/dipole of source) in all directions, is classically projected inside a detector to symmetrically generate converging waves (a collapsing field/wavefunction) from this directional beam (to excite a "single atom" − to be seen localized in a detection system by this other atom's-assisted "self-focusation"). Or it can be delocalized (in space and time) by means of the natural Fourier (optics) transformation (such as "lens" that causes the illusion of duality) and statistically reconstructed (the ergodic hypothesis). Thus all interpretations can describe this phenomenon without any strangeness. It is necessary to change a perception of time from asymmetrical [4] (non-linear, multipole, gravity) to symmetrical (without directional time flow) at the fundamental level. I.e. correct theories are without over-exotic solutions (exotic particles, worlds or phenomena such as inflation), without need of exotic mathematics (non-Euclidian, non-commuting, imaginary) and they are simple (by Occam's razor) and "boring".

And the static (infinite) universe is also possible (in any interpretation). The "recreation" of hydrogen can be done due to CMB radiation (and other radiation from an extragalactic background), which also explains Olbers' paradox [3]. The nuclear fusion in stars produces radiation which thermalizes down to a microwave background with a temperature of about 2.7 K in (low mass density) space. (The CMB energy density approximately corresponds to the radiated binding energy from nuclei of observable mass). If the local density of mass is above some "threshold" the CMB energy is concentrated ("up-converted") back (by unknown structures) in inverse processes. Thus the energy of CMB is used back for nuclear disintegration (i.e. it is conserved) and the (finite) degree of bonded nuclei is possible (in the equilibrium). E.g. the (extra-large) galactic nucleus (which property, defining it to be the black-hole, can not be proved by a finite detection/measurement/number − i.e. without proving its horizon or singularity) with total mass about 10^{11} of the solar masses and with the bulge diameter about 100 kly (i.e. with surface $2.5 \times 10^{42} \, m^2$) can receive (as the central absorber,) power from the cosmic background radiation (with intensity 3 μW/m^2) up to 8.4×10^{34} W (If the most of this radiation is captured.). This corresponds to the energy of 2.6×10^{42} J within a year which is able to disintegrate nuclei (using ratio 500:1 derived with respect to the abundance of the chemical elements) with total mass of about 1.5×10^{29} kg (i.e.

75% of the solar mass) per year. Thus the average period of closed cycle is roughly on the order of 10^{11} years. I.e. if the time for observable phase (its average period) is about 10^{10} years then this ratio is comparable to the ratio of the observable and "dark" mass (energy) which is below 10%.

Thus the cosmic background radiation (together with other radiation) can drive the emission of mass (disintegrated protons and electrons) into relativistic galactic jets (If these jets are pointed to the Earth, we can see more intensive source and thus sources observable in deep space are "only" a case of this type.). After it, these particles recombine and form nebulae. And finally a formation of stars closes this (infinite) cycle. The closed cycle model (conserving a conservation law) is also mathematically more probable than the "finite" Big Bang model (crating a "creation law").

[1]   P. Křen: Casimir Energy and the Electromagnetic Field, 2009, http://wbabin.net/science/kren9.pdf
[2]   A.Rivas, A.Luis: Nonclassicality of states and measurements by breaking classical bounds on statistics, 2008, http://arxiv.org/abs/0809.3034
[3]   P. Křen: The Source, the Field or the Metric? (Part II), 2009, http://wbabin.net/science/kren10.pdf
[4]   P. Křen: The Asymmetry is Our World, 2009, http://wbabin.net/science/kren7.pdf