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Appreciating physical processes that create mode lock pulses while recognizing non-interaction of waves

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As we gaze to observe a beautiful scenery or a lovable face, it remains unperturbed by innumerable other crossing light waves from other sceneries all around us. This is NIW-property (Non-Interaction of Waves). But we model emergence of the temporal train of spatially separate “mode locked” pulses due to Fourier summation of the CW amplitudes of all the cavity longitudinal modes (frequency comb); which is sanctioned by the mathematical Superposition Principle (SP). There are two contradictions. The longitudinal modes achieve their CW status right at the turn-on of the cavity excitation; then these CW waves “temporarily” re-adjust their constant velocity, c , to re-group their energies into a temporal pulse train! The deeper problem lies with the assumption that infinitely extended Fourier modes (in space & time); which violates conservation of energy; is at the foundation of the SP. SP cannot explain the emergence of Superposition Effect; which we measure as physical transformations after the detecting molecule experience simultaneous multiple-E-vector induced dipolar stimulations. Note also that Fourier summation predicts the coalescence of the longitudinal modes into a single central frequency, suppressing the cavity “comb frequencies”, which exist and are finding very many practical applications. This paper will explain the evolution and emergence of “mode locked” pulses taking into account the NIW-property of waves. It is driven by the emergence of the oscillatory time-gating property of the intra-cavity mode locking devices under the influence of simultaneous stimulations by the beginning transient spontaneously emitted wave packets to the final steady state stimulated emissions.

Biography

Chandrasekhar Roychoudhuri is exploring the fundamental nature of light and particles. He has initiated the continuing SPIE conference series, “Nature of light: What are photons?” He has written a book, “Causal Physics: Photon Model with Non-Interaction of Waves”, 2014. He came to USA as a Fulbright Scholar; did his PhD from the Institute of Optics, University of Rochester. He has worked for US industries (TRW, Perkin-Elmer and United Technologies) for 14 years and over two decades in academia in India, Mexico and USA. He was a member of the Board of Directors of both SPIE and OSA.

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