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Illusion of space and time in 1-dimension

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Abstract
Recently there was speculation about the illusion of space and time by e.g. Nathan Seiberg and other theoreticians [1]. We report to have observed such a quantum mechanical phenomenon in 1-dimensional tunneling [2, 3]. There is only one special example published with microwave photons, in which barrier front time and barrier dwell time was separately measured. This experiment displayed both, zero dwell time and non-locality in the barrier [2]. Incidentally, no time was observed with photons, phonons, electrons, atoms, and molecules recently [3,4]. Obviously it is as Brillouin conjectured, all waves behave equal [5].

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Text

Following we present data of varies particle's, i.e. waves with a measured zero tunneling timeτinside barriers. Different tunneling experiments with photons, electrons, atoms and molecules have a zero time spent inside the potential barrier [3]. Examples of measuredand calculated zero barrier tunneling times $\boldsymbol{\tau} = 0$ are presented in table 1, Non locality was measured first with photons [2]. The no time in tunneling was denied by several studies in which the tunneling times was not separated in barrier front time and the barrier dwell time $\boldsymbol{\tau}$[13,14,15]. However, there are former theoretical and experimental studies which claimed the no time dwelling in barriers and have been confirmed experimentally recently [8 - 12].

The picture below displays the photonic experimental set up for the zero time and non-locality experiment. The cut-off frequency of this barrier guide was9.48 GHz, the incident tunneling frequency was 8.7 GHz corresponding to the photons energy. The measured transmission time of this tunneling length was zero [2] and a location of the tunneling microwave was not measurable [2]. A similar set-up was used to tunnel Mozart's symphony 40 at a speed of 4.7 c presented at international seminars, e.g. at the MIT Boston 1994.

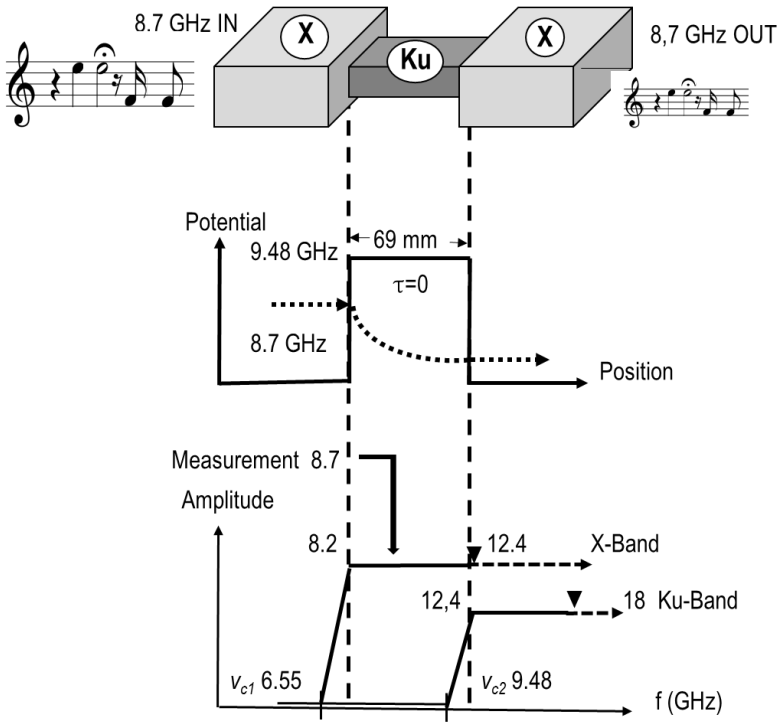

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Fig.1 Configuration for the measurement of an undersized wave guide, the photonic barrier. The measurement frequency was 8.7 GHz meaning well inside the transmission band of x – band (8,2 to 12,4 GHz) and far below the cut off frequency of Ku – band (9,48 GHz).

Photon	(Microwave phase time)
Photon	(Microwave double prisms gap)
Phonon	
Electron	
Ammonia	
Atom Rb	

Table 1: data of waves observed with tunneling time $\boldsymbol{\tau} = 0$ [4]

The speculation of the ***illusion of time and space*** will change the classical knowledge of our sensory world. In fact the tunneling process is located in the quantum world and is described by an imaginary mathematical relation. In optical physics the tunneling imaginary modes are called evanescent waves. We don`t understand that the real two physical facts, time and location do not exist in the case of tunnel experiments. However experimental analysis showed that we don't measure a dwell time of photons spent in a barrier nor we can measure their locality [2, 3]. In fact, these two real quantities, time and location are not observable in tunneling barriers. The quantities are described by imaginary mathematics, i.e. evanescent modes. Important, the wave i.e. the particle is not changed due to tunneling, all the quantum-characteristics are stable. This behavior is well known in fiber optical couplers of our communication systems which are based on the tunneling process. Measurements of the tunneling time within the barrier region of Rb atoms have been interpreted as a time spent essential in the tunneling barrier. However, the observed time was spent at the barrier front as shown in considering the universal tunneling time [7]. Obviously, as studying the 1- dimensional tunneling process we conclude time and space are illusions [2]. We expect "the illusion of time and space" will stimulate a philosophical discussion.

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