



The Nikola Tesla Way of Energy Transport

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Light contains the key to open the doors to Heaven.
Unfortunately, the same key fits on the doors to Hell

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1.0 Introduction

Nikola Tesla has been one of the greatest scientists who has ever lived. His inventions still are amazing the world by his creativity and his unique way of thinking. One of his most powerful and unique ideas has been the concept of the possibility to transport massive amounts of energy through the air without any wires and finally (almost) realized before his death by his famous “Wardenclyffe Tower”.

Till now the “Wardenclyffe Tower” has not been very successful. Because at his time Nikola Tesla did not have the financial resources and the correct theoretical background to design the right concept for his unique project.

The electromagnetic energy, emitted from the “Wardenclyffe Tower”, has been emitted equally in every direction (omni-directional) and for that reason the intensity of the electromagnetic energy decreases with the square of the distance. At a relative short distance, the electromagnetic energy density has already decreased with such an amount that the emitted energy density will be just enough to broadcast signals to a radio/ TV or a smart phone system.

To transfer high electromagnetic energy densities through the air over a long distance, a different way of energy transport will be required. A one-directional way of energy transport like the electromagnetic energy transport within a LASER beam will be necessary to maintain the high energy densities over a long distance, broadcasted at the source (A different kind of “Wardenclyffe Tower”).

1.1 The Development of TESLA PLANES

Nikola Tesla has built his unique design based on the fundamental theory of Electrodynamics developed by James Clerk Maxwell in 1865. According to the Classical Maxwell Theory of Electrodynamics, the concept could never work for large amounts of energy and could only work for very small amounts of energy transport just enough to make the broadcasting possible for radio/ TV and smart phone.

With the introduction of the LASER (Light Amplification by Stimulated Emission), new possibilities for the emission of light and the transport of electromagnetic energy became available. The first LASER was built in 1960 by Theodore H. Maiman at the Hughes Research Laboratories.

The original idea that electromagnetic waves propagate in every direction with the same universal constant, the speed of light, corresponds with Maxwell's Theory of Electrodynamics in 1865. With the introduction of the Laser it became clear that it is also possible to emit a beam of light in one single direction while the speed of light in the directions perpendicular to the direction of propagation equals zero.

This fact seems to be in contradiction with Albert Einstein's famous theory of Special Relativity. But that is not true. Einstein's theory of Special Relativity is based on the propagation of light in the absence of any interaction by gravitational fields or electromagnetic fields. Under these circumstances, indeed light propagates with the well known speed of " $c = 299,792,458$ [m/s]. But that value is only true in absolute vacuum in the absence of any gravitational or electromagnetic field. In glass e.g. the speed of light is lower due to "Electromagnetic Interaction" between the electromagnetic field of the beam of light itself and the electromagnetic field generated by the glass atoms.

In this New Theory about Light it will be demonstrated that it is possible to slow down the speed of light until exactly zero ($c = 0$ [m/s]) in many directions. This is not in contradiction with the theory of special relativity. Because this effect of slowing down the speed of light until exactly zero is based on “Electromagnetic Interaction” in a comparable way the speed of light slows down within a material like glass due “Electromagnetic Interaction”.

Only based on the concept, described in this New Theory, of ”Electromagnetic Interaction” the speed of light will be reduced until zero in the directions perpendicular to the direction of propagation of the High Intense Energy Beam of “TESLA ENERGY” which will make it possible to transport Mega Watts of Energy through the air without any “Energy Transporting System of Wires and Cables” necessary.

In general, the laser frequencies are so high that the Laser radiation will not be harmful for the human brains and organs.

A LASER operating in the region of visible radiation operates at a wavelength of 380 [nm] to 740 [nm]. The phenomenon, which is called dielectric breakdown, occurs in air at an electric field intensity (strength) of about $E_{MAX} = 3 \times 10^6$ [V/m]. At that field intensity the air becomes a conductor and it is impossible to transport electromagnetic energy through the air with field intensities higher than: $E_{max} = 3 \times 10^6$ [V/m]. Because within a beam of light the amounts of electric energy and magnetic energy has been equally divided, the Energy Density “w” of an Electromagnetic Field within a beam of light can be expressed as:

$$w = \frac{1}{2} \epsilon_0 E^2 + \frac{1}{2} \mu_0 H^2 = \epsilon_0 E^2 \quad (A.1)$$

The Maximum electromagnetic Energy Density in the air without ionization of the air equals:

$$w_{MAX} = \frac{1}{2} \varepsilon_0 E_{MAX}^2 + \frac{1}{2} \mu_0 H_{MAX}^2 = \varepsilon_0 E_{MAX}^2 = 8.85 \times 10^{-12} \times (3 \times 10^6)^2 = 79.65 \text{ [W/m}^2\text{]} \quad (\text{A.2})$$

The maximum energy density transport of a LASER BEAM equals 79.65 [W/m²]. For a LASER beam with a cross surface of 1 [m²] the Electromagnetic Energy Transport will be maximum 79.65 [W]. This amount of Energy Transport is too low to supply e.g. an airplane of enough energy to travel through the air without landing in between to import fuel.

When the Broadcasting System (a new kind of “Wardenclyffe Tower”) covers an area of 1000 [m²] about 80 [kW]. the maximum Electromagnetic Energy Transport of the TESLA beam will be about 80 [kW].

This new TESLA “MASER (Micro wave Amplification by Stimulated Emission Radiation) SYSTEM” will supply enough electromagnetic power to keep an airplane in the air without refueling.

To design this new “TESLA MASER SYSTEM” a resonance cavity has to be built with the dimensions of 33 × 33 [m²] which covers an area of about 1000 [m²]. Comparable with the design within a LASER an electromagnetic wave with a frequency of 9.09 [MHz] will resonate within the resonance cavity, building up a high density electromagnetic MASER BEAM which will be emitted by the Semi-Transparent side of the resonance cavity.

The New Electromagnetic Theory, which is fundamentally different from Maxwell’s Theory, will be described in the following chapters. This New Theory will explain how it is possible that due to Electromagnetic Interaction the speed of light will be equal zero in the plane perpendicular to the direction of propagation. Building in this way an “TESLA

BEAM” which is comparable with a low frequency “LASER/MASER BEAM” emitting the electromagnetic energy in one single direction.

A tracking system connecting the plane with the 80 [kW] “TESLA BEAM” broadcasting system will supply the plane of enough energy to stay in the air without landing and taking off to refuel.

The TESLA-planes will need batteries to cover the areas where there is no “TESLA BEAM” available or due to extreme bad weather conditions the broadcasting of electromagnetic energy will be impossible. The TESLA planes stay in the air and may fly all over the world while the humans (pilots, staff and passengers) will travel by much smaller shuttles to and from the airports.

By using the much smaller shuttles to bring food, passengers and staff from the airports to the large TESLA-planes a lot of energy will be saved because this system of electric energy supply is much cleaner and no energy will be wasted by the landing and taking off of the large planes. For these reasons this system will be much more environmentally friendly.

1.2 Introduction into the Theory Generate, to Control and to Direct a beam of Electromagnetic Radiation generated by a TESLA Maser beam.

Albert Einstein, Lorentz and Minkowski published in 1905 the Theory of Special Relativity and Einstein published in 1915 his field theory of general relativity based on a curved 4-dimensional space-time continuum to integrate the gravitational field and the electromagnetic field in one unified field. Since then the method of Einstein's unifying field theory has been developed by many others in more than 4 dimensions resulting finally in the well-known 10-dimensional and 11-dimensional "string theory".

String theory is an outgrowth of S-matrix theory, a research program begun by Werner Heisenberg in 1943 (following [John Archibald Wheeler](#)'s⁽³⁾ 1937 introduction of the S-matrix), picked up and advocated by many prominent theorists starting in the late 1950's.

Theodor Franz Eduard Kaluza (1885-1954), was a German mathematician and physicist well-known for the Kaluza–Klein theory involving field equations in curved five-dimensional space. His idea that fundamental forces can be unified by introducing additional dimensions re-emerged much later in the "String Theory".

The original Kaluza-Klein theory was one of the first attempts to create an unified field theory i.e. the theory, which would unify all the forces under one fundamental law. It was published in 1921 by Theodor Kaluza and extended in 1926 by Oskar Klein. The basic idea of this theory was to postulate one extra compactified space dimension and introduce

nothing but pure gravity in a new (1 + 4)-dimensional space-time. Klein suggested that the fifth dimension would be rolled up into a tiny, compact loop on the order of 10^{-35} [m]

To use simple notations, the Einstein convention will be used. In the Einstein Convention the index always changes from 1 till 4. Others prefer the changing of the index from 0 till 3 but it has the same meaning.

This means the term: “ $x_a y_a$ ” has to be interpreted as:

$$x_a y_a = x_1 y_1 + x_2 y_2 + x_3 y_3 + x_4 y_4 \quad (\text{B.0})$$

In Cartesian coordinates this means:

$$(1,2,3,4) \rightarrow (x, y, z, t) \text{ or } (0, 1, 2, 3) \rightarrow (t,x,y,z)$$

In Classical Electrodynamics, the Electromagnetic Field has been derived from the 4-dimensional Potential 4-Vector. The 4-dimensional Electromagnetic “Potential 4-vector”, oriented in the classical complex 4-dimensional “Minkowski Space” will be defined by φ_a (“a” varying from 1 until 4) in which:

$$\varphi_a = \begin{pmatrix} i \ V/ \ c \\ A_3 \\ A_2 \\ A_1 \end{pmatrix} \quad (\text{B.1})$$

In which V equals the scalar electric potential and \vec{A} the 3-dimensional magnetic vector potential.