

EARTH POWER SPECTRUM AND ITS POTENTIAL AS A USABLE ENERGY SOURCE

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Earth's magnetic halo is generated in its core of molten nickel-iron alloy. Currents driven by Earth's rotation, like a dynamo, spread the magnetic field far into the surrounding space. Billions of cosmic rays bombard Earth every second; they are guided by the magnetic field and pulled into tightening spirals toward the polar regions. The highly energetic charged plasma flowing out from the Sun and charging past the Earth's magnetic field act as a gigantic natural generator whose power continually drives the auroral currents. Sometimes the enormous energy pump runs in low gear (quiet aurora); sometimes it will rev up with heightened solar activity, thereby increasing the flow of plasma out of the plasmasheet and driving the auroral discharge more powerfully.

The aurora is a natural, visible manifestation of a large electrical-current system that is continually pumping millions of megawatts of electromagnetic power into the upper polar atmospheres, exceeding the total electrical generating capacity of the United States. Auroras begin on the Sun, where the energy spirals away into interplanetary space at hundreds of miles per second; four days after it leaves the sun, this high speed stream of solar wind reaches the vicinity of the Earth where the plasma collides with and moves around the planet's magnetic field. The high-speed solar wind reshapes the field into a comet-shaped cavity called the magnetosphere. The sunward shock front extends some 10-15 earth radii into space, while the night-side magnetotail stretches out beyond 60 earth radii (R_e), reaching beyond the Moon's orbit.

As the solar wind blows downstream along the edges of this magnetic cavity, the energies leak in and become part of an immense reservoir called the plasmasheet, which runs down the length of the magnetotail. The plasma that leaks in is carried back toward the Earth by the flow of the plasmasheet and down the funnels over the two polar regions, causing a constant ring-shaped glow. The path of the auroral energy streaming in along the Earth's magnetic field lines appears as a thin, glowing curtain hanging from 60 to hundreds of miles above the Earth. The magnetosphere is a big container of energy storage.

Highly energetic Cosmic rays pervade our inner solar system and constitute the Earth's radiation environment. Energies from about 100Kev and up to over 1000Gev can penetrate deep into the Earth's atmosphere. Many of the cosmic rays are isotropic (they bombard the Earth from all directions) bathing the Earth in a cosmic flux of extreme high intensity. Examples being a high frequency electromagnetic radiation of 19GHz. In which the Earth is immersed; (1) and a still higher background flux of 33GHz. Moving past the Earth at a velocity of 320 km/sec (2). More recent observations are of a Soft-X-ray background of less than

1keV, highly isotropic and predominantly of extragalactic origin (3); and a spectrum of Microwave isotropic background signals at less than 3 millimeters wavelength, with a large peak at 1 mm (4). Additional cosmic ray energies in which the Earth swims include numerous X-ray signals from Binary Stars, Pulsars, Nebulae, and other Globular clusters and Galaxies (5); and extremely energetic Gamma-ray emissions of Galactic and Extragalactic source (6). These varied cosmic rays not only influence the vibrant solar wind but stream into the Earth magnetosphere and are often accelerated to even higher energies; these energies filter down through the magnetosphere and the other radiation belts strengthening and flowing toward the Earth's atmospheric cavity, there helping to build the charges which we observe as lightning.

Now that we are aware of this tremendous energy sea in which our stellar home floats, what are the possibilities of tapping some of its energies for our immediate use for everyday convenience?

First let us look at some history of inventors and discoverers of this suspected available energy source. During the last three decades of the nineteenth century, John Ernst Worrell Keely, a student of music and vibration phenomena, was rotating spheres, disassociating water and levitating rather heavy objects via his acquired knowledge of vibratory harmonics. Because Keely wrote of his discoveries and experiments using the language of music, and also a somewhat original manner, he was often seen in disfavor among his science contemporaries; therefore he was seldom taken seriously. It has taken four years of music study for this author to begin to understand the brilliance of Keely's performance. He understood the Laws of Harmonic multiplication and interaction, so as to attune with the energies of the Earth and the Cosmos; he specifically mentions *42.8KHz.* as being a significant frequency for some of his experiments. Keely's work needs to be rediscovered in light of today's science of vibratory knowledge (7).

Nikola Tesla, the giant of all science discoverers and inventors of the late nineteenth century, constructed a large experimental workshop just east of Colorado Springs, Colorado, under the shadow of Pike's Peak. Here he planned, in 1899, to continue his research into the nature of the electrical phenomena of the Earth. Much has been written and discussed about his eight months of experimenting with large resonant coils, high voltage charges, power transmission, earth standing waves, lightning discharges, earth currents and long distance communications. I wish to point out a few specifics. His transmissions were mostly within the frequency range of from *40 to 200 KHz.* He went to great lengths to eliminate the tremendous spark discharge, and his oscillator was constructed in order to utilize the Earth/atmospheric cavity. Tesla's mathematics was not complex and he went to great lengths to clearly explain his processes to other engineers. He claimed to have tapped a source of hundreds of horsepower from his constructed oscillator and utilized it through other resonant coils at remote locations, this system offered him a communications link of great

distance, using the Earth's waveguide cavity. The drawback was that , once it was all constructed, its energy was all free (8).

Henry Moray in 1909, using a radioactive/semiconductor device, tuned circuits, an antenna and a ground connection, was able to tap what he called cosmic energy. Through later years of refinement, reaching as much as 60,000 watts drawn from a small table-top box, he could power lights and heating elements, even doing away with the external connections. His frequencies of operation were never divulged, to the knowledge of this author (9).

In Seattle, Washington, about 1919, Alfred Hubbard constructed and installed a boat on a nearby lake. The boat was equipped with a 35 horsepower motor and transducer which were used in exact electrical resonance with a specially constructed transformer which was placed on the nearby land and connected to an underground aerial array of 18 inch tubes filled with mercury at each end of 1200 foot wire lines. The four aerials were oriented to the cardinal points of the compass. Again the frequency of operation is unknown.

Hans Coler, in 1933 in Germany, constructed a circuit using magnets, coils, and capacitors, with a resonance which would tap an unknown source to light lamps. He stated that his research into the nature of magnetism had lead him to conclude that ferro-magnetism was an oscillating phenomena with a frequency of about 180 KHz. This oscillation took place in the magnetic circuit of the apparatus and induced in the electrical circuit oscillations, the frequency of which of course depends on the values of the components used. These two phenomena interact and gradually build up a tension.

In the 1920's, Lester Hendershot constructed a free energy device using two basket weave coils with cylindrical capacitors built in the center of the coils. He expressed that his device was tapping a magnetic force field. A test of the coil design with a radio frequency resonance bridge revealed that the coil, out of the circuit, was self-resonant in the low end of the AM radio broadcast band, around 500 KHz. Its construction is described in the Spring, 1983 issue of *Energy Unlimited*. In the last paragraph of the article, the author suggests using a harmonic of 14.3 KHz.(10)

As can be seen, we have a number of precedents for the possibility of utilizing the energy of the Earth and its fields; however, none have yet gained much popularity for public use.

In the past century certain inspired and creative scientists and engineers felt their thoughts and intuition flowing toward an energy source formed of the workings of the Universe itself—but what of now; what do scientists of today see? Are there new clues to guide this free energy path? First, from Stanford University, researchers beamed very low frequency (VLF) radio waves to the magnetosphere, the outer region where belts of charged particles stream toward

the Earth's magnetic poles. The signals followed the curves of the magnetic field back to Earth and were detected half-way around the World—*amplified a thousand times* in some cases. The radio signals were strengthened by gathering energy from electrons within the Van Allen radiation belts. Each time one of the world's 50 or so VLF (3-30 KHz,) transmitters emits its signal, streams of excited particles cascade into the Earth's atmosphere from the outermost regions of the magnetosphere. Even low frequency (LF) radio waves leak into the upper layers, causing this same phenomena. (Low Frequency: 30-300 KHz.)

The injection of small signals into the energy belts creates something like a super-transistor effect, altering the motion of free electrons thousands of miles out from the Earth's surface. This *Tesla Magnifying Resonance* effect can control enormous energies by miniscule triggering signals. The Stanford physicists state, "We can amplify waves in the magnetosphere for a Global Communications at lower frequencies." (11,12)

Plasma wave electric field measurements with the solar-orbiting Helios spacecraft have shown that intense electron plasma oscillations occur in association with type III solar bursts. These radio bursts are produced by particles ejected from a solar flare and are characterized by an emission frequency which decreases with increasing time; this is attributed to the decreasing electron plasma frequency, f_p , encountered by the solar flare particles as they move outward through the solar corona. The measured frequency range is between 30 KHz. And 200 KHz., with the highest amplitude signals from about 40 KHz.-100 KHz. These bursts seem to show both the fundamental and second harmonic structure at kilometric wavelength.(13)

The magnetosphere exhibits a number of important resonance's at lower frequencies; such oscillations are thought to be associated with periodic phenomena such as transverse oscillations of individual field lines loaded with plasma and compressional oscillations of the entire magnetospheric cavity. The surface waves generated at the magnetopause by solar-wind pressure variations, or like the wind over the water phenomena, can propagate deep within the magnetosphere and therefore local field line resonances.(14)

The term plasma waves characterizes all those waves that can propagate in a plasma or that have their wave characteristics significantly modified by the presence of a plasma. Plasma waves can be predominantly electromagnetic (having both electrical and magnetic produced fields of current fluctuations) or electrostatic (having only an electric field produced by fluctuations of electric charge). Regions with significant plasma-wave activity in the Earth's magnetosphere are observed VLF emissions (10 Hz. To 30 KHz.) which have been attributed to amplification through the interaction between coherent particle beams and plasma waves. Particle dynamics of the trapped radiation belts are determined by some of these waves. Kilometric radiations (50-500 KHz.) observed above the auroras appear to relate to the auroral particle acceleration and may be comparable to the radio emissions from other planets. Recent

evidence suggests that strong electrical coupling exists between the ionosphere and the lower atmosphere. Large-scale horizontal electric fields of magnetospheric and ionospheric origin map down, with little attenuation, to an altitude of about 10 km. The total potential voltage drop across regions like the polar caps and the auroral ionosphere can be a significant fraction of the average ionospheric potential with respect to the Earth (240,000 V.). (15)

A publication by the Center for Academic Publication in Tokyo, Japan, *Magnetospheric Plasma Physics*, edited by Atsuhiko Nishida, brings together some prominent world physicists for a very clear picture of the Earth energy structure, along with some rather complex mathematics for those wishing to follow their modeling. (16)

The conducting ionosphere can affect the instability by shortcircuiting the electrostatic part of the Earth electric field, thus requiring less energy to release charge from the upper layers. These auroral arcs result in an acceleration process called ring currents, processing along the magnetic field lines that connect the magnetotail with the ionosphere. This is the primary supply of energy for the aurora, setting up an oscillating field aligned acceleration of aurora particles; therefore forming the aurora arcs. This process releases a radiation called auroral Kilometric radiation (AKR) from 50 to 500 KHz. These arcs are generated by convection currents formed in the plasmopause of the magnetotail. These arcs curve toward the Earth on the night side and enter or create the aurora field at around 68 degrees latitude between 22 and 24 hours local time.

The Auroral Kilometric Radiation (AKR) has a frequency spectrum of from 30 to 500 KHz., with a peak power at around 200 KHz. The total power is about 1000 MegaWatts, and the radiation is right-handed polarized. It originates at a low altitude, less than three Earth radii, with a radiation power of about one per cent of the energy dissipation of the auroral particles.

It appears that the electrostatic waves stimulate the ionosphere, thus allowing the influx of the powerful AKR energies. Very strong electrostatic waves have been monitored, between 17.8 and 100 KHz., with the greatest amplitude at around 31.1 KHz. Some of these same effects and frequencies have been observed by the Voyager 2 flyby of Jupiter and Saturn, within their magnetospheres.

With the latest observations from Earth and from remote-sensing (satellite), we are gaining a confirmation of Tesla's Colorado Springs experiments. With his oscillator he was able to stimulate the ionosphere through high voltage, and then allow the cascading of the upper layer currents, thereby simulating the natural action of the aurora and also of lightning. Which brings us to the observations of this author.

At 8000 feet above sea level, in central-west New Mexico, where the air is clean and clear, and the atmosphere is electromagnetically quiet, exists the ideal

location for observing the electrical nature of the Earth. Lightning activity may be watched at all times of day and all seasons on oscilloscopes connected to various antenna arrays. The Earth/Atmosphere wave cavity is seen to go into a damped oscillation of around *86 KHz.*, with the discharge of lightning upon the planet. There are observed variations of plus or minus 5 KHz. Interestingly enough, this is about the first harmonic of the Keely frequency, and on the first day of observation it was exactly like that harmonic of *42.8 KHz.* On a number of occasions, as a non-lightning storm passed through the area, extremely large oscillations were monitored on the above ground array at *82 KHz.* It appears as if the local atmosphere likes to vibrate at that rate.

One quiet March day, while monitoring the Russian and USA Extremely Low Frequencies (ELF) transmissions, it was decided to try an antenna on the ground. So, one mile of twisted-pair steel wire was run directly west, lying on the ground surface. There were surprising results. First of all, the signals received were unexpectedly strong, the first observation gave a frequency component of *42.8 KHz.* These signals were a composite of lightning pulses being received from the Earth, except now the damped oscillation was for the range around *40 KHz.* Some of the lightning discharges are the same as are seen on the overhead ariel array, but there were many others not observed from that source, and also the signals were stronger and more continuous. Here, quite clearly, were vibrations suggested by Keely over one hundred years ago, detectable from the Earth and its surrounding atmosphere. Keely claimed that he was utilizing vibrations of the Earth and the Celestial to perform his experiments with motors and levitation. Since this discovery, the workings of Keely's harmonic manipulations have been vindicated and undoubtedly clarified for this author's understanding.

With longer term monitoring the signals have been found to vary with frequency and amplitude throughout the day, with noticeable changes at sunrise and sunset. The prominent components are observed around *37.3 KHz., 42.8 KHz.* and *48.5 KHz.* When this was discussed with Michael Heleus of Astrosonics, who has extensive computer-generated information for the harmonic interrelationships of the planetary movements, we discovered direct correlations with the planetary harmonic interactions. This goes to confirm the sightings of the Voyager spacecraft as to the electrical activity of the outer planets, which could mean an existing link between the magnetospheres of the planets.

To summarize: We see abundant possibility for the storage of energies within the Earth's magnetosphere. We have a mechanism, confirming Tesla, for drawing this energy into the lower atmospheric cavity. We are able now to see how nature handles this influx of energy toward the Earth's surface through the aurora oscillations. The Earth's atmosphere vibrations are harmonically related, and therefore desirous of self-oscillation, as given by Keely. In the article referred to about the Hendershot device, the frequency of *14.3 KHz.*, if multiplied by 3, equals the frequency of *42.9 KHz.*, if multiplied by 6 equals *86 KHz.*, and by 9

equals 128 KHz., another observed frequency, or when multiplied by 12, equals almost the suggested frequency of Hans Coler. These inventors were clearly on the path to utilization of this abundant energy source, which surrounds us each minute. Humanity lives at the lower reaches of a vast ocean within the cosmicly stimulated bubble of the magnetosphere, and upon the twirling spherical generator of the Earth. What a masterpiece of Creation.

A final quote from Nikola Tesla: "Throughout space there is energy, it is a mere question of time when men will succeed in attaching their machinery to the very wheelwork of Nature....The knowledge that there is throbbing through the Earth, energy available everywhere, would exert a strong stimulus on students, mechanics and inventors of all countries. This would be productive of infinite good. Conditions such as never existed before would be brought about. It would enable Man to dispense with the necessity of mining, pumping, transporting and burning of fuels, and so do away with innumerable causes of waste! New frontiers might be opened, unlimited power for all the world, inexpensive power for the farmer to light and heat his home, to drive his tractor, to harvest his grain, to increase his food output, electric power for millions of homes, so economical that every appliance could be operated electrically. The real beginning of a 'Golden Age of Civilization.'"

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