UNDERSTANDING THE GRANDER® TECHNOLOGY
AN OVERVIEW OF THE WORKING & SCIENTIFIC PRINCIPLES

The Basics

All Grander® Technology devices are stainless steel containers filled with water of a high grade that is produced at the manufacturing facility in Jochberg, Austria. Inventor Johann Grander calls this water "Information Water" because of its ability to influence the physical structure and energetic properties of nearby water, and it is this property on which the function of all Grander® Technology devices resides.

The Information Water is produced by exposing a high quality natural spring water to an ultra-high frequency magnetic current produced by Johann Grander's magnetic generator. The details of this process are proprietary, and a trade secret of the company; however, the process may be envisioned as being like a laser. A laser light is the result of the excitation of a system of light emitters: when excited in the proper way, through resonance, a coherent mode of light emission is achieved. The primary process developed by Johann Grander subjects water, which is a very complex system of charged, oscillating molecules, to a particular form of excitation that generates corresponding "coherent" modes in the fluid structure.

This water then has been found to retain this structure and to convey some of its properties to nearby water through resonance. In general, the claim is that the technology improves the internal structure of the water being treated. The key questions to answer are:

- Is there any basis for the notion that water can form higher-ordered structures?
- What does "improving water's internal structure" mean?
- How could they be sustained for long periods of time (Grander devices have been shown to function for 15+ years without replacement or recharging)?
- How could the devices affect other water systems without physical contact?

In this document we will address each of these questions and then review the practical benefits of the technology.

Water & Higher-Ordered Structures

In the context of this document, water's structure refers to the highly variable networks that form as a result of hydrogen bonding in water. It is common knowledge that, due to the dipole moment of the H_2O molecule, individual molecules form weak bonds due to the attraction of the positive end of the

dipole for the negative. In liquid water many, many molecules form bonds that result in extensive networks or structures.

These structures possess not only geometric and chemical properties, but vibrational and quantum effects as well. Thus, the "internal structure" of the water refers to the shape or geometry of the extended molecular networks that may form, their vibrational modes and their quantum coherent effects as described below.

A brief review of several scientists exploring these topics is provided below (some discussions of the applications to follow):

Dr. Gerald Pollack, University of Washington

Dr. Pollack's research has shown that water forms an extensive, ordered structure at the boundary with hydrophilic surfaces. Called the "EZ", or exclusion zone, this water is differentiated from so-called bulk water by a liquid crystalline structure marked by molecular alignment, increased viscosity, unique light absorption characteristics, and various electric effects. Dr. Pollack has further shown that the effect forms at the boundary of water with air, which lends credence to the notion that dissolved gases and particles in water also contribute to the production of ordered water structures. The boundary of the EZ is also marked by a charge separation, which has been shown to be increased by exposure of the EZ to various forms of light, and which may be fundamental to photosynthesis.

Dr. Emilio DelGiudice, University of Milan

Dr. DelGiudice has shown that the theory of Quantum Electrodynamics, applied to water, predicts the spontaneous formation of coherent domains (CD's). Coherence is a unique state in which multiple molecules behave as a single system (individual degrees of freedom are given away to the whole system, as a type of "contribution" to the generation of increased order). These CD's have unique properties, as described by Dr. DelGiudice, including the ability to store energy of a particular frequency and to give this energy to specific biomolecules that are resonant with it. CD's are predicted to be a natural development in water, as water shifts from the more random, bulk water

state to the more organized, coherent state, releasing energy to surrounding processes. CD's are thus capable of transforming low-grade, high-entropy energy from the environment into high-grade, low-entropy forms of energy, which is very important for all living systems (and provides a very interesting description of the Grander Technology at work, as will be noted below).

Dr. Maewan Ho, Visiting Professor of Biophysics at Catania University

Dr. Ho has provided a ground-breaking synthesis of physics, chemistry, and biology in the work described in her book The Rainbow & the Worm, which describes the thermodynamics of living systems. She developed a novel microscopy technique that, for the first time, has allowed scientists to directly see coherent molecular structures present in the molecular order of living tissue (in live cells). In her work, Dr. Ho has shown how living organisms rely on coherent systems to store and transfer energy with near 100% efficiency, to transform energy from one form to another, to develop and maintain long-range communication in the body, and to maintain long-range ordered dynamics in both space and time. She has also extensively written on the role of structured water in living systems and biological processes.

Dr. Eshel Ben-Jacob, Professor of Physics, Tel Aviv University

Dr. Ben-Jacob has used bacteria structures as his "instrumentation" to explore the impacts of various chemical and electromagnetic influences upon the structure of water. In his own words, as taken from an abstract prepared for presentation at a scientific conference on water, Dr. Ben Jacob says, "Guided by bacteria response to treated water, I will further reflect on the possibility that water can store biological relevant information, presumably in its complex structural organization (long range water)… I will reflect on the possibility that phenomena like "water order", "water memory" and "water information" are real and not artifacts or mysticism as they are still perceived by the scientific community at large. And if so, the existence of water order and memory calls for rethinking of water and the development of a new theoretical framework for the understanding of water."

Dr. Vladimir Voeikov, Faculty of Biology, M.V. Lomonosov Moscow State University

Dr. Voeikov has conducted novel research into the role that water structures play in transforming and releasing energy within the environment as well as within biological organisms. He has studied two novel mechanisms by which "structured" water releases energy to maintain the far from equilibrium energetic conditions by which all living organisms are marked. His work suggests that water plays a key role in releasing electronic energy that is utilized by biological systems, through reactions with various oxygen species, and also in transforming low grade energy from the environment into a higher grade that is more valuable and essential to living systems. He has suggested that a number of environmental influences impact water's functional capabilities in this regard, and that the structure of water must be considered an important environmental factor.

Each of these researchers has written and spoken upon the topic of water's internal structure, and emphasized its importance with respect to the functioning of biological systems. It should be clear that the structure of water is a legitimate scientific field supported by an international body of research.

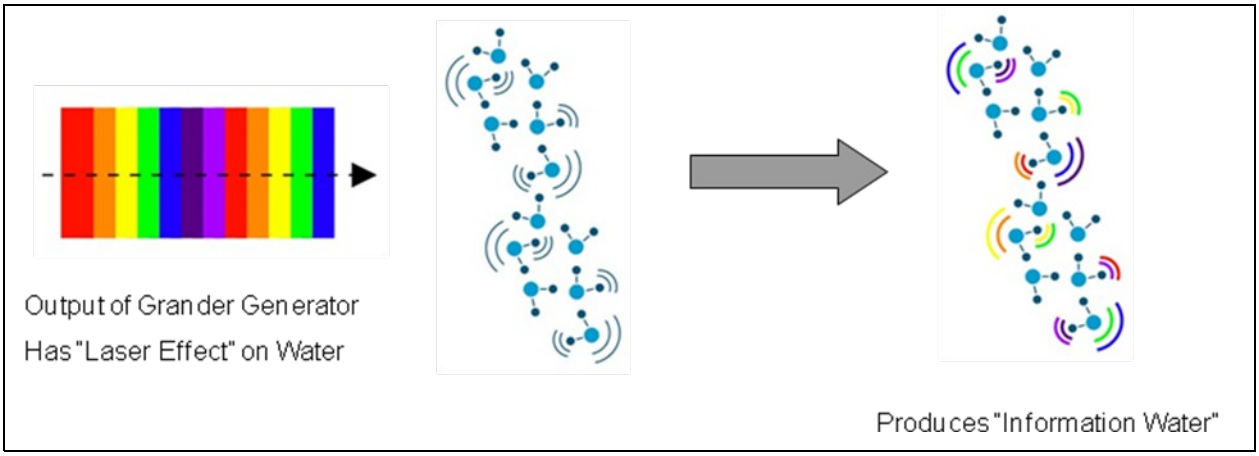
We will look now to draw upon the few theories presented above to lend credibility to the notion that the Grander® Technology is plausible based upon present day science. Note that the technology is not yet fully described by science, and that the intention here is not to provide any rigorous proof. None of the ideas presented above would fully describe the workings of the technology, and the effort to do so would be found to be flawed by its limitations.

The Grander® Effect

The Grander® Effect is the basic process by which all Grander® Technology devices function. The Information Water sealed within each device resonates with nearby water, generating an improved structure in the latter and producing a variety of biological and chemical effects.

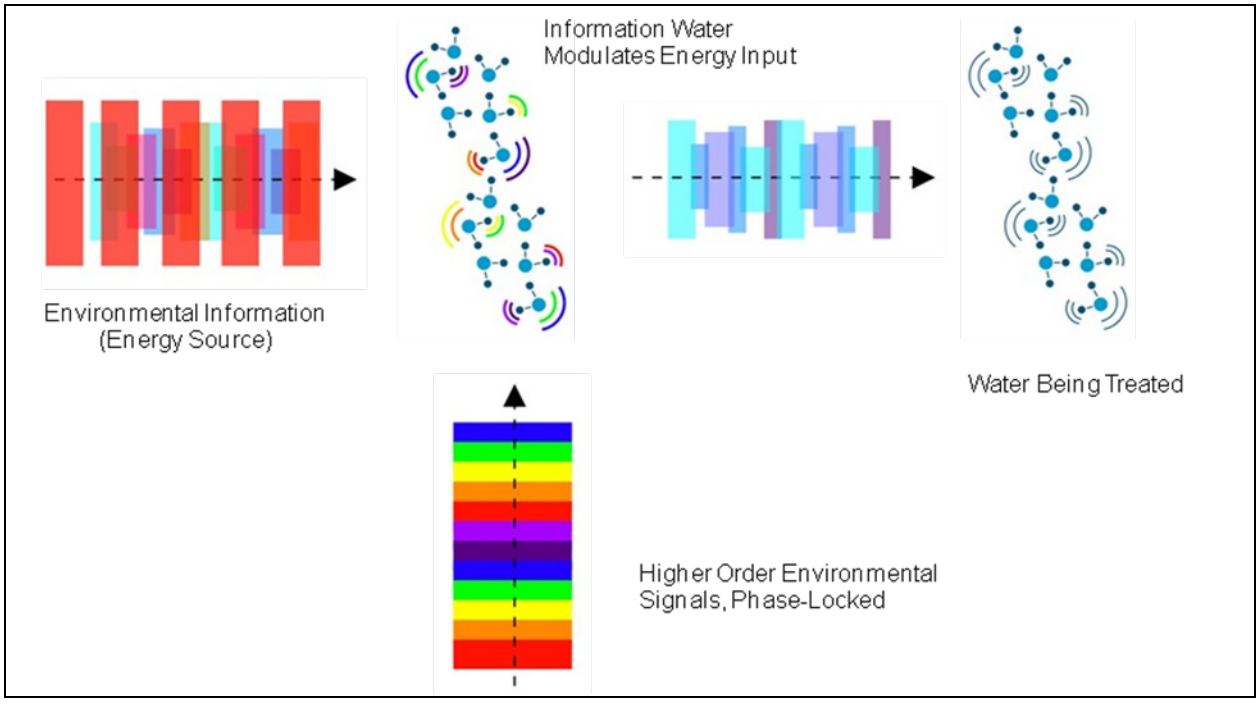
The diagram below outlines the treatment process, and will be described step-by-step.

Step One: Creation of Information Water



The output of Johann Grander's generator is a set of frequencies that have a "laser like" effect on water. We may hypothesize, along the lines of the information presented above, that one result is the creation of large scale coherent domains within the water, which carry this "information".

Step Two: Treatment of Other Water



Information Water, shown in the middle, actively modulates energy received from the environment and gives it back in a more structured, valuable form. Several of the authors noted above have commented on water's ability to modulate energy received from the environment, and released it again in an improved form. The water we wish to treat resonates with this signal, and its structure is modified accordingly. Thus, the units are "powered" by low grade environmental signals. The technology does not violate any thermodynamic principles: it merely changes the pattern of energy that it receives into another form that is more valuable.

Dr. Rachmanin, a Russian scientist and advisor to the World Health Organization on water issues, has studied the Grander® Technology extensively, and offered the following:

> *"[The] GRANDER® Technology can have its effect by absorbing very small energy spectra from its environment. And because of its structure, it is also capable of radiating a very specific energy spectrum to nearby water."*

This coincides very well with the expected capabilities of coherent systems, which include the ability to "phase lock" to specific signals and to one another, and to transform or shift energy received from the environment into alternate frequencies or conditions.

The idea of phase locking is important, because it suggests a mechanism by which the coherent structures within the Information Water could sustain their structure for long, long periods of time: namely by constantly resonating to an external signal of the proper condition. The idea presented in the graphic above is that the water structures in the Information Water, excited into a coherent state by Johann Grander's ultra-high frequency generator, are continuously renewed or sustained in this state through interactions with specific energy sources in the environment. We cannot say with precision what those are, but it is certainly plausible that coherent domains could be sustained for an exceptionally long period of time if repeatedly excited by an external signal of the proper type.

The real innovation of Johann Grander then is not the creation of improved structures within water, which is commonplace in biological systems, but the discovery of how to form coherent structures capable of sustaining themselves for indefinite periods of time through receipt of particular environmental signals. He would describe these signals as being wholly natural, and part of the Earth's natural relationship with the cosmos.

The idea that coherent structures may be tuned to environmental signals is also not uncommon, as the photosynthesis that powers the biosphere is dependent upon specific pigments in chloroplasts that are resonant to particular excitation energies from the sun.

<u>Conclusion on Working Theory</u>

The questions posed above have thus been addressed in the work of various scientists in the field, and plausible mechanisms for the working processes of the Grander® Technology have been provided.

What is the benefit of all this???

The Benefits of Grander® Technology

There are a number of benefits to treating water with this technology that conventional treatments cannot provide, beginning with the improvement to the water's internal structure. Case study information will be provided separately, with benefits generally being derived from the following:

- Improved bacteria response. A more active ecology results in a lower average nutrient loading, a cleaner and more stable system with less biological problems or fouling.

- Systems require less management and produce much less problems for system operators.

- Change in average particle size of suspended solids. Research has shown that treatment typically reduces the average particle size of suspended solids. This produces a number of benefits including extended filtration life, reduced fouling, and life extension of membrane technologies and other advanced filtration systems.

- Chemical kinetics are improved. Dr. Pollack's research has shown that the formation of EZ's around particles can change the particle kinetics, and while this is not a definitive statement on the subject it is clear that changes in structure can influence chemical kinetics. This is an additional mechanism by which chemical concentrations may be reduced, and the efficiency of aqueous chemical reactions is improved.

- Many biological systems, including bacteria, plants, and animals, perform their functions with greater efficacy after treatment. Examples:

    - In agricultural applications, plant yields and quality often increase, and in animal husbandry animal health, production, and behavior all show improvements.

    - In cooling towers, algae is reduced as beneficial bacteria demonstrate increased nutrient reducing capacity. At the same time, only minor biocide doses are required to keep the biological communities in control.

- Improved transport capacity. Treated water tends to display an increased ability to transport materials. This may be related to the change in average particle size noted above, but in general treated systems exhibit less fouling, reduced scale and corrosion, and enhanced transport properties. Corrosion in crannies, niches, "dead zones", etc. all tend to be reduced. Less deposits means less corrosion due to the formation of under-deposit corrosion dynamics.