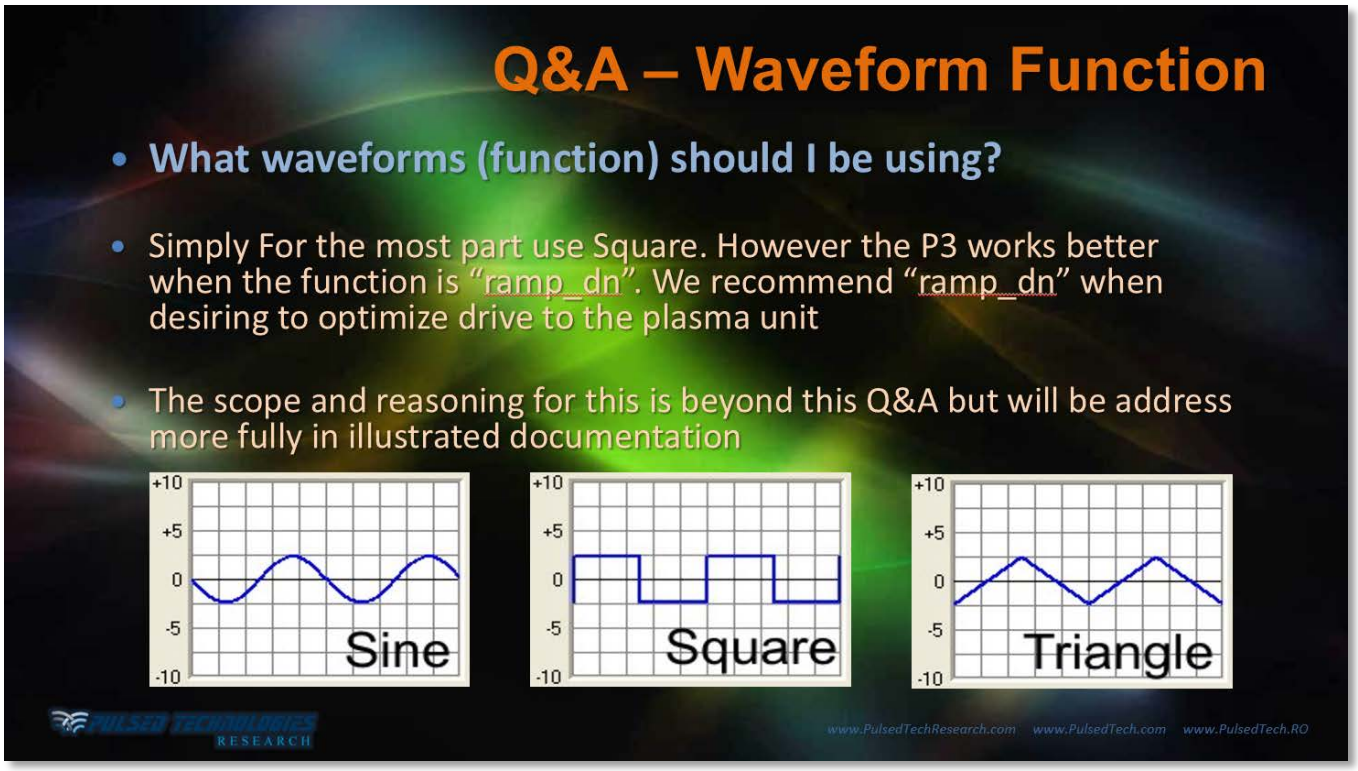
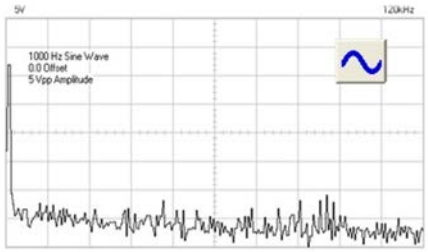
What waveforms should I be using?

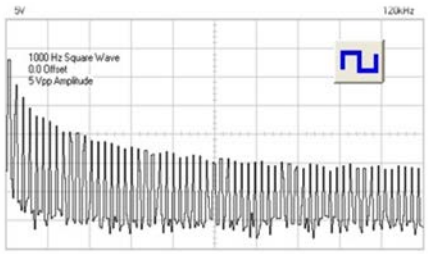


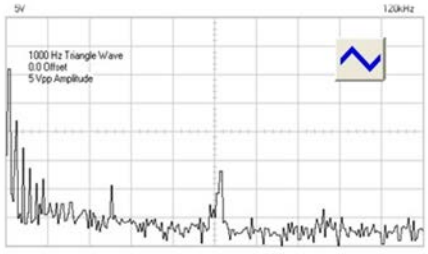
There is no simple answer to this seemingly simple question. For most users, a simple answer would be "**Square Wave**".

A fuller and more detailed explanation allows the educated user to optimize and better utilize their equipment for whatever their desired task and to perhaps develop super-effective application strategies for their unique personal needs.

Waveform selection depends greatly on the desired use, the equipment being used, even the method(s) of application. Those involved with the scientific, laboratory, astronomy, physics, and etc. applications generally never ask this question as they have specific experience and practical technical use needs. Members of the "Rife" and wellness communities often experience these concepts for the first time within the realm of much misinformation. For them, the general answer is most often "**SQUARE WAVE**", but with qualifications.

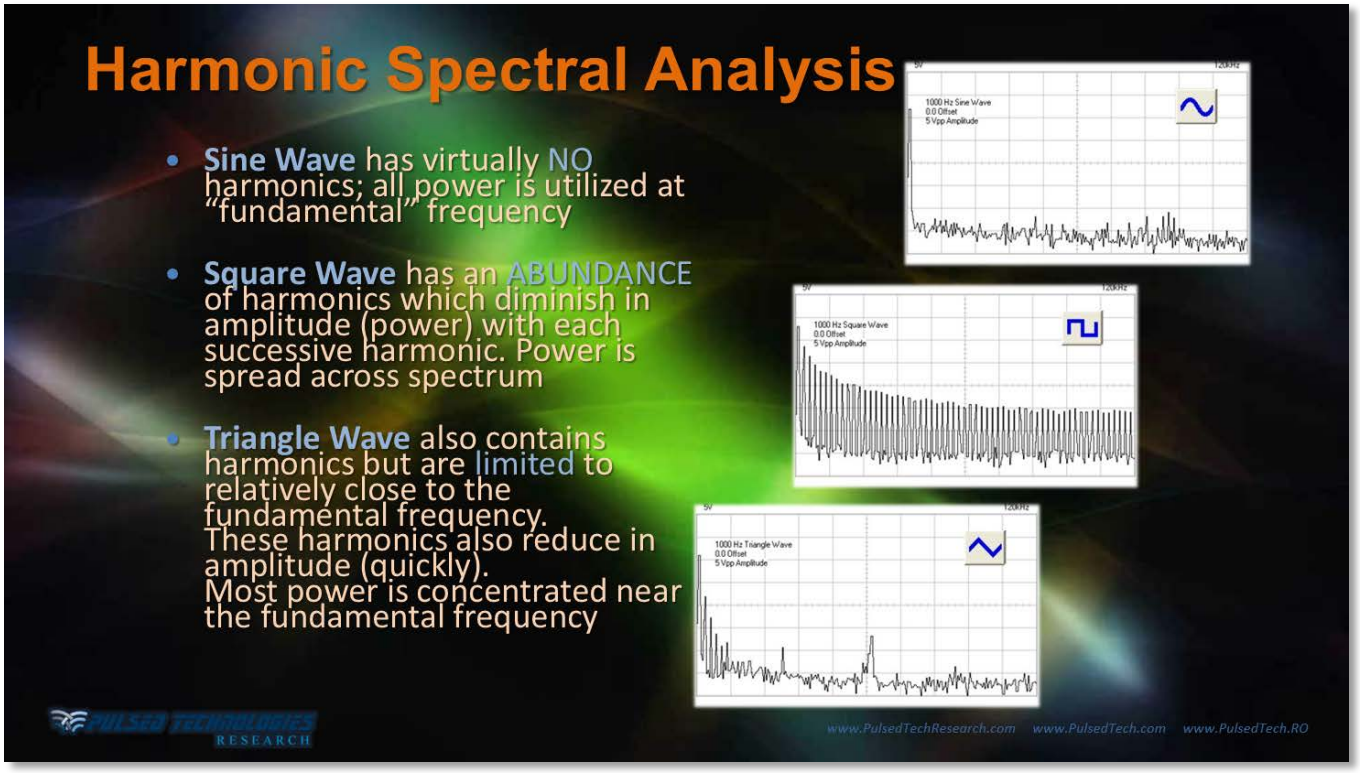






HARMONICS

Square Waves are harmonic rich! The diagrams to the right show a spectral analysis of the basic Sine, Square, and Triangle waves. In each situation, a



1000 Hz tone is being generated at each of the given waveforms, but the coherent resonances being generated across the spectrum are most predominate with the Square Wave; almost totally non-existent with the purest form of the frequency, the Sine Wave, and extremely limited to only the first few harmonics with the Triangle Wave.

Almost all early Rife-type devices and, unfortunately, many current-day devices are technically limited to relatively low frequency sound (audio) frequencies; the general area of hearing, 20 Hz to 20,000 Hz. There were a number of reasons for this at the time, but the science has progressed for many. It is demonstrated, using Rife terminology that the Mortality Oscillatory Rate (MOR) is the specific frequency at which the target pathogen resonates with is a particular frequency actually much higher than these often reference audio frequencies. The difference is the many hundreds of thousands of inferior Hz. devices desperately rely on the use of Square Wave harmonics to reach the actual MOR in hopes that it is powerful enough at that point to have an effect on the target pathogen.

HARMONIC POWER

We have clearly seen in the previous illustrations that each successive harmonic has a slightly lower amplitude than the previous one. In the example of a Sine Wave, close to 100% of the power is delivered exclusively into the main "Fundamental" Frequency with little loss to any other harmonics or spurious emissions. The harmonic rich characteristic of the Square Wave distributes that power among each and every harmonic across the spectrum. The Triangle Wave only shares its power with very close harmonics. With the limited capabilities exhibited by most older low frequency systems using Square Wave, it is easy to see that even if the harmonic frequency was right on the target MOR, it is not only possible, but very likely that the amplitude (power) at that desired frequency may not be enough to bring about the desired, or any effect to the target.

FREQUENCY ACCURACY

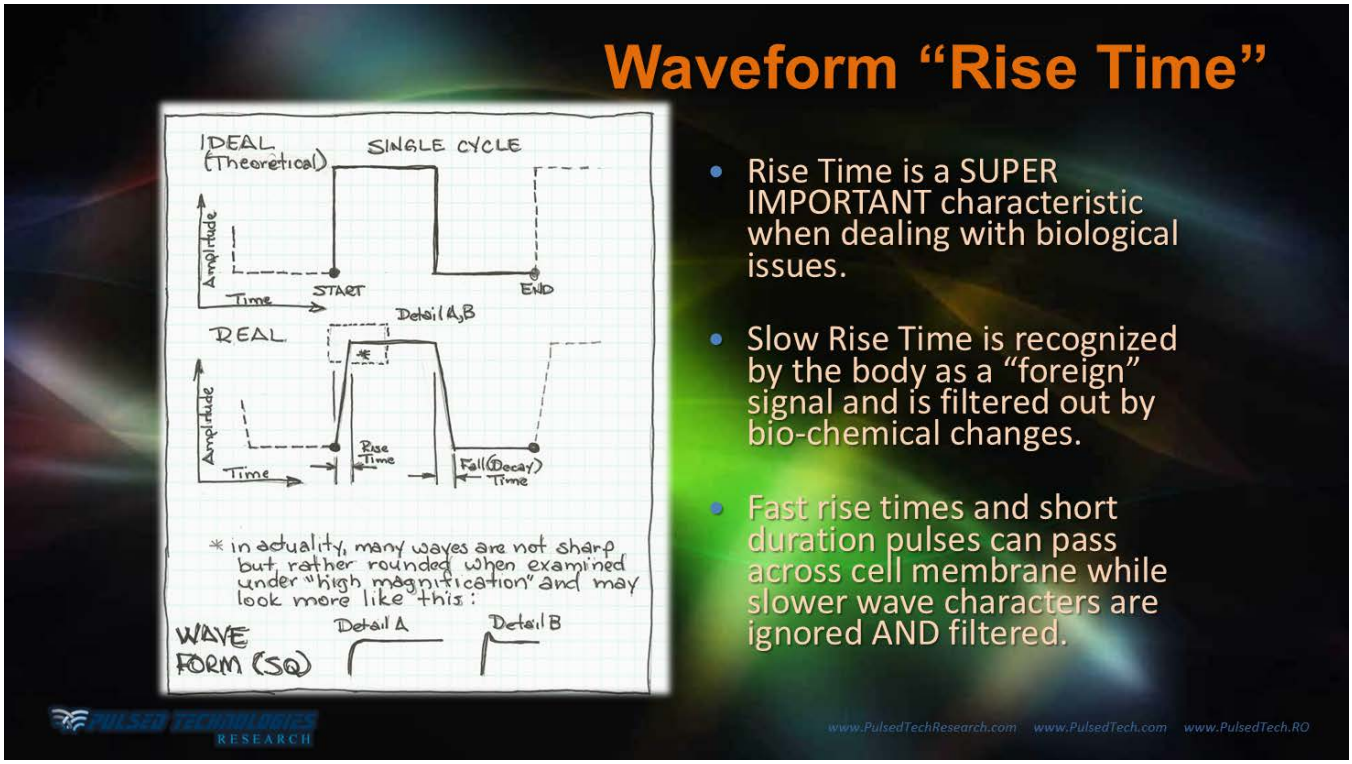
Frequency accuracy is critically important. It is the frequency/wavelength match with the targeted pathogen needed to be "in tune" to receive the intended energy. A small error in frequency quickly becomes an enormous error as you move to harmonics further away from the fundamental frequency. For instance, frequency that is even a fraction of an Hz off in the audio range can quickly be set off from effective frequency by dozens, hundreds, or even thousands of Hz by the time the harmonic multiple nears the intended/actual MOR.

PRECISION FREQUENCY

Early systems often used relatively simple computer systems to generate frequency. Ironically, the accuracy of frequency generation used techniques which weren't very accurate and because of mathematical issues with the relatively slow processors, accuracy could sometimes be off by 4 Hz or more. While sound cards brought a bit more accuracy, however, it could be off. Both offered TERRIBLE waveform though and virtually little to no waveform control. Pulsed Tech instruments never rely on the computer for waveform generation. Impeccably accurate dedicated Direct Digital Synthesis (DDS) is done within the microprocessor-controlled equipment to assure precise and meticulous purity. The computer simply becomes the control panel instructing the instrument to perform scripted tasks, leaving the dedicated Frequency synthesis chips to do what they do best.

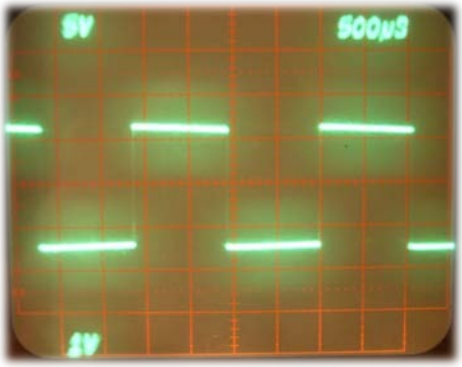
WAVEFORM PURITY

Since those early days, we now realize the importance of fast rise time on the front end of the wave form. While

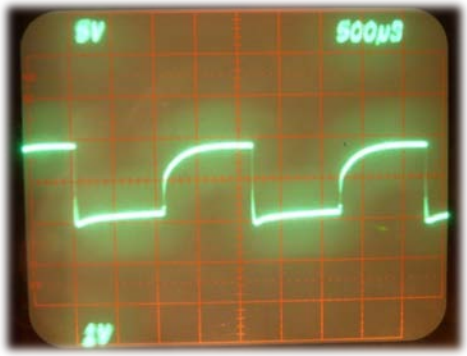


frequency is just one attribute of the emission created, many other attributes need to also be considered. It was learned decades ago that several attributes were very important for Rife-type work. It was understood that fast rise time greater than 20 milliseconds (us) - see illustration - was important for the body to accept and continue passing through the body and into the cells. It is believed that a slow rise time less than 20us was interpreted by the body as a foreign assault and would immediately begin chemically changing the area to impede or prevent further "foreign interference".

While end-users often assume these important details are taken care of by their manufacturers, it is unfortunate that critical details like this often are often not addressed; nor can they easily be by the end user.



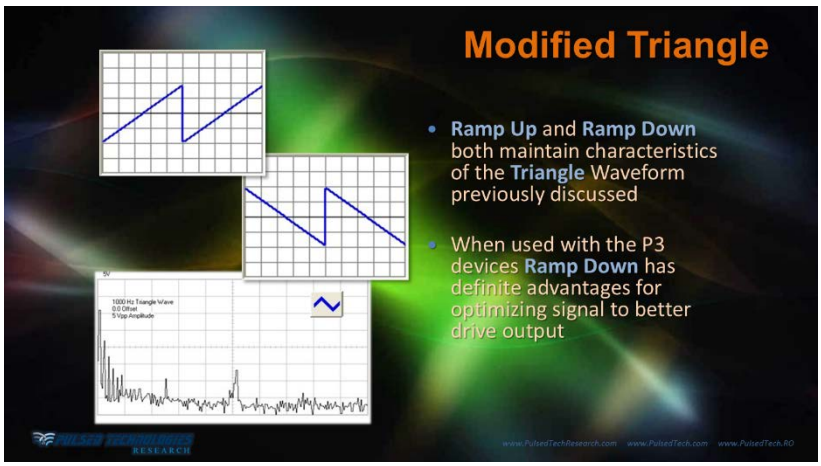
The extremely poor rise time measured on this current and popular device was measured at approximately 750us which is abysmally higher than the acceptable threshold of 20us!

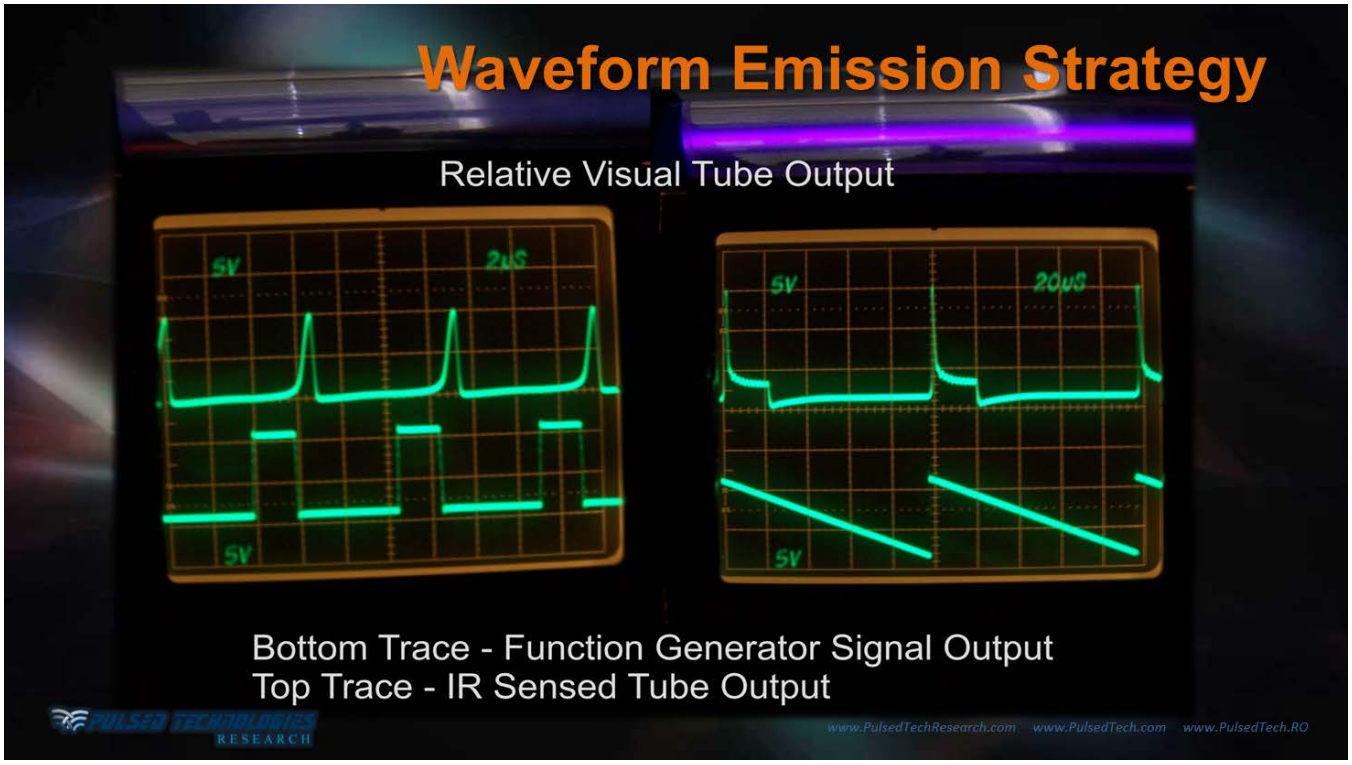


The poor waveform shown in the lower photograph is intended to be delivered as that waveform shown in the upper photo. In practical terms, because of poor design, the effectiveness timeline, assuming frequency, amplitude, and all other aspects are perfect, is, at best, limited and brief.

SOMETIMES SQUARE IS NOT THE BEST SELECTION!

One of the general misconceptions often propagated within the Rife community is that you should always use a Square Wave. Justification for this is typically for the reasons just given. A further assumption is that what you put in is the best of what you get out. Neither of these assumptions are absolutely correct. When extensive intermediate circuitry is involved, especially in high voltage plasma application, it can be very beneficial to use a more modified waveform to further control and build up the charge needed to maximize the "hit" that is put on the plasma tube. A modified hybrid of both the Square Wave and the Triangle Wave is the "Ramp Wave" which understandably comes in two opposite forms; that is Ramp Up and Ramp Down. The characteristics of minimal harmonics and focused power are similar to the Triangle Wave.





Advanced instrument design and strategic deployment of controlled waveforms can provide superior and efficient delivery of the signal for optimized performance of this plasma system.

In the side-by-side comparison shown above, the photographed Plasma tube is shown above the dual trace oscilloscope. The lower signal trace indicated that the PulsedTech PFG frequency generated signal being input to the system. The upper trace indicates the actual photonic signal output measured by an ultra-high-speed phototransistor optimized within the therapeutic range.[1]

On the conventional (left) side, we see the expected Square Wave and as a result we also see the expected pulse representing the emission output from the plasma tube. Visually notice the relative output of the tube.

The scenario in the right photograph is that of a Ramp Wave input with a very sharp cut-off. (Important Note: Although beyond the scope of this conversation, both input signals shown here represent negative voltages likely unique to PulsedTech products. In the case of the Ramp Down, the voltage potential is actually increasing with a sharp cut-off to zero.) This shows the signal voltage building up to -10 volts DC and then quickly shutting off to 0 volts. Within the circuit components, this allows for a much more efficient build up and saturation/storage of energy in some of the proprietary components that will be be quickly released to the tube and provide a much higher impact and higher level of excitation of the plasma tube. When comparing tube output, either visually or electronically, the difference in performance is obvious and quite dramatic.

Note: In the earlier "Rise-Time" illustration (page 3), a characteristic dimple or spike was noted as being advantageous as opposed to the less desirable rounded front end of the waveform representing slow rise time. In this case, this represents an incredibly BENEFICIAL output. It was also clearly shown the square wave output is

[1] An Introduction to PulsedTech's Bioenergetic and Bioelectric Technologies: Part 2, The Science, Art & Physics, see specifically the graphics of the Electromagnetic Spectrum and Therapeutic Window http://www.pulsedtechresearch.com/the-electric-human/section-iv/ (Presentation Materials 2014)

including massive harmonics as well; far in excess of what the original waveform being input might have done alone. The sharp spike on the front end of the waveform is the characteristic which has been shown necessary to "jump" the cell membrane and be utilized as energy within the cell.

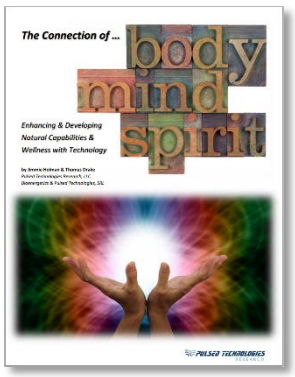
This is a good example of positive effects of waveform manipulation that are available with Pulsed Technologies instruments. *(See "ControlNote" at end of article)*

BRAINWAVE EXCEPTIONS

There are exceptions to most of the points brought out in this article. While most of the details and comments have been directed at Rife-type applications, Pulsed Technologies has been working with several international strategic partners in adding what may seem to be entirely different field of research, but is in fact actually closely related. While seasoned meditators and those involved with serious brainwave research better understand the close relationships, the tools capable of assisting them in these seemingly different fields are frankly quite similar IF the precision elements of wave control exist within the instruments.

Clean brainwave manipulation by entrainment is best done by pure Sine Wave although especially careful methods are required for safe personal application and use. PulsedTech is working with several international partners to make this advancing technology possible to educators, experimenters, and seasoned researchers alike.

The Connection of Body-Mind-Spirit: Enhancing & Developing Natural Capabilities & Wellness with Technology [2] reveals some of this work in more detail for those who are interested and is freely available at the URL below.



[2] http://www.pulsedtechresearch.com/the-connection-of-body-mind-spirit/

SUMMARY

The bottom line is that the final decision on waveform and various characteristics really depends on the user's unique needs, the method of application, and what you are intending the instrument to do. The operating environment, the equipment configuration, even the level of expertise of the user play a role in that determination. The PulsedTech instruments, especially the PFG product line, provide the precision versatility that allows even a novice to get started easily, and implement the many enhanced characteristics and capabilities as their knowledge broadens and understanding grows; making an excellent strategy possible for an effective return and maintenance of health and wellness needs.

Rife's crude frequency generation in the 1920s and 30s utilized massive amounts of the then latest technology, at best still had only marginal control over certain aspects we now understand are critical to this amazing technology.
We are confident that if Rife were alive today there would be Pulsed Technologies instruments in his state of the art Rife Research Laboratory.

PulsedTech Control Note: The ability and need for advanced waveform manipulation is far beyond the scope of this brief Q&A but will be discussed separately in a technical document on Waveform and Plasma Optimization being prepared for release in the future within the *Electric Human*.