Electromagnetic Pulse Source Using Fluidized Electrons

by

Ken Shoulders [1] ©2005

Abstract

A new ElectroMagnetic Pulse (EMP) technology is proposed based on the rapid decomposition, in lightning-like fashion, of cubic centimeter quantities of fluidized electrons yielding both high-energy particles and high intensity electromagnetic fields capable of deep penetration, massive disruption of electronic systems and having a long range, low lethality electric stun gun effect of high accuracy. A simple deployment method is proposed using ballistics by incorporating fluidized electrons into rounds of ammunition ranging from .22 caliber to 20 mm. The possibility of a more sophisticated guidance means employing a beam of light is also introduced.

Background

Although a classic EMP technology is well established, a new offering using fluidized electron disintegration is introduced here as a different approach in that the energy originates from previously fluidized, energetic electrons and is vastly more effective than the well-known microwave only methods presently utilized. This difference arises partly because there is a disruptive attack on the equipment being disabled by the fluidized electrons ejected at very high velocity as well as having an almost unlimited bandwidth of the high-powered EMP produced. There is a similarity between this method and the first stage of an atomic bomb blast, one of the most effective forms of EMP known.

In order to differentiate between this newly proposed method and the older EMP designation, the acronym High Energy Particle (HEP) is appended and the complete method designated HEP-EMP. This designation accurately aligns with the disintegration process of the EVO (**E**xotic **V**acuum **O**bject) fluid [2] [3] and couples the description with the more effective atomic explosion method. The damaging effects extended by this method of high-energy particle release are distinctly different from that normally produced by relatively narrow band electromagnetic fields only.

The combined action of both particle and EM energy effects produced are judged to be many orders of magnitude more effective for electronic device disruption. Coupled with the basic damage mechanisms, the propagation mode of the original EVO disruption is lightning-like, following paths of self-preference instead of having a more limited, radial thermal signature. The likely pathway of disruption would be through the intricate conductive networks of electrical apparatus, leading to their destruction.

Experimental Observations

Disintegration Process: Experimental evidence on this subject is limited to small-size EVOs having a maximum diameter of 20-micrometers. This limitation reveals the most critical area of work needed for large-scale physical verification, namely, further condensation of high velocity EVO droplets into larger quantities of stationary fluid having known and controllable properties.

When stressed, EVOs show a gradual disintegration into smaller electronic structures accompanied by intensive radiation due to charge acceleration. This spatial decomposition leads to an increased radius of influence as the conductive segments of the disintegration are acting as active and dynamic antennas. The extension in time of the decomposition process produces a widening of the EM emission spectrum, particularly at the low frequency end. Examples of this gradual disintegration process of an EVO can be seen in Fig. 1 through Fig. 10 in Appendix I. Annotation adjacent to the figures briefly describes the particulars of the figure.

The ion recombination flash of visible radiation seen from decomposition of 10-micrometer diameter structures is shown in Fig. 11 and Fig. 12 of Appendix I and discussed in the accompanying annotation. The flash shown has a volume of about 1 cubic centimeter using 10 micrometer EVOs. A naive calculation of the visible flash volume using linear assumptions from an initial 1mm cube of such material is 1 cubic meter and from a 1 cm cube of condensed electron HEP-EMP source is 1,000 cubic meters. A volume much larger than this is more likely from a sequential EVO disintegration extended over time and space.

As shown in Fig. 13 through Fig. 15 of Appendix I, an EVO having a diameter of 20 micrometers bores cleanly through a thickness of solid material, having an average atomic mass of about 30, to a depth of ½ mm. The slug of recovered ejected material, having dimensions of 20-micrometers by 100-micrometers, is projected to a velocity averaging 10^7 centimeters per second. Such high velocity impact on metals, always having an EVO leading the impacting charge, are very damaging to electronic devices due to the x-rays generated as well as the shower of particles projected from the reverse side of the target as discussed later.

Multi-Cycle Process Alternating Between Particle Bombardment and Radiation: A multi-cycle process alternating between particle bombardment and a radiation mode is a particularly energetic process of electron fluid dishevelment that is very effective in defeating simple shields. Multiple shields of both conductive and non-conductive dielectric material are necessary to be even partially effective in protecting semiconductor type gain devices. As an example of a reference to the generation of EVOs using optical energy impinging on a single conductor electrode, see the data accumulated in the literature on *Unipolar Arcs*. One such discussion is found in [4].

Many examples of this cyclic process between particles and radiation were seen in routine laboratory experiments conducted by Shoulders over years of operation wherein an optical mode of energy transfer connects EVOs across very high potential barriers that would otherwise provide charge exclusion. This is basically an optically based regeneration process or unipolar arc. Multiple shielding techniques could be used in an attempt to thwart this semiconductor destruction mechanism as an intermediate process for device protection, but eventually, devices must be hardened at a fundamental level of design to survive such intense bombardment.

Although urgency for showing these effects is felt, there is no simple way of repeating them as seen in the Shoulders' laboratory as they were always encountered as a side effect of something else being pursued.

High Electron Energy Production by EVO Decomposition: In a paper published by Ken Shoulders and Jack Sarfatti on *Superluminal Particle Measurement* [5], examples of pinhole camera measurement show a yet undetermined breakdown mode of EVOs capable of producing large quantities of ejected electrons with velocities in excess of 50 KeV from an EVO formed at less than 2 KeV. This transformation of velocity is likely related to an instability producing an electronic ramming effect similar to those reported in the literature. As an example, Raudorf [6] has cited a case whereby 15 KeV electrons injected into a traveling wave tube configuration produced up to 17 megavolt electrons after undergoing impaction with a space charge region in the tube.

Such measured EVO transforming action is highly directional and will transcend potential barriers naively erected to suppress electron transmission. By studying fluidized electron properties, the cause of such instability modes will likely be understood and utilized to advantage.

The data shown in the cited *Superluminal* web paper by Shoulders and Sarfatti [5] were taken with a pinhole camera and energy analyzer that will not likely be used in the first phase of work to be done. Unless some other method of detecting high velocity electrons is introduced, this effect is not likely to be demonstrated. At the 50 KeV level of energy, electrons mixed with small EVOs often become indistinguishable from X-rays when using simple detectors. The false readings obtained on such energy dispersive detectors often indicate cosmic particle energy levels due to a form of detector pileup.

X-Ray and High Velocity Particle Measurements Using a Pinhole Camera: Data taken on X-ray imaging and high velocity particle ejection using the pinhole camera in vacuum are shown in the book, *EV-A Tale of Discovery*, available from Ken Shoulders. On page 4-33 in Fig. 4:30, deflection plates used to analyze both energy and polarity of particles in the camera are shown being shadowed by energy attributed to X-rays of undetermined energy. This image is also shown in [Fig. 16] of the accompanying data in Appendix I. The energizing radiation penetrated through a 1 millimeter thick piece of aluminum indicating moderately high energy level.

Likewise, high-energy micro particles are shown being detected by the pinhole camera on page 4-36 and Fig. 4:33, also shown in Appendix I as [Fig. 17]. These neutral particles have been knocked out of the rear side of an EVO target and registered on a channel plate electron multiplier detector operating at low gain.

Although data on the these two effects is very important for this EMP project, neither of these measurements will likely be repeated in the first phase of work due to the complexity of building and operating a pinhole camera of similar design.

Philosophy of Work: In considering intermediate test work, the test energy should be somewhat equivalent to the expected energy eventually used in an attack on an electronic system but this is not practical at this time, however, the energy density can be approximated. In the case of a simple inductive spark source like that used in the "Charge Clusters in Action" demonstration shown in Appendix I, [Fig 13], a 20-micrometer diameter EVO was used and will likely be the size used in preliminary test work. The initial diameter of an eventual HEP-EMP cluster might be in the range of 1 cubic millimeter. This is an active material volume ratio of 125,000 and could also be the total damage increase expected for the larger quantity of fluidized electrons eventually used in a HEP-EMP device.

A necessity in all of this work is that the focus be kept on the ubiquitous nature of EVO generation and not let simple-minded thoughts of "its just a spark" defeat the thrust of what must be dealt with eventually, which is, that fluidized electrons, having vast amounts of stored energy, are capable of giving rise to countless and multifarious destructive events. To align with this new mode of thought, the erroneous supposition of electron acceleration through externally applied voltage should be discarded in favor of locally generated guidance potentials. These local potentials arise from sequential EVO disintegration.

Theoretical Considerations

Although there are numerous theories, 7 by now, dealing with the effect of electrons clustering in such dense formations as those typifying an EVO, no single theory covers all aspects of the available measurements. Suggestions for such dense charge organization range from simple electrodynamic binding methods for electrons to those having no electrons in them at all but composed of an entirely new substance initially formed from electrons but being capable of resolving itself back into electrons upon cessation.

A theory by V. Dzhunushaliev, from his paper "Polarized Spacetime Foam" [7], indicates the use of a spinor field capable of screening a bare electric charge, which is in line with the diminished amount of externally expressed charge measured in EVOs. If the final electron fluid we seek has the same electron number density as that measured for small EVOs, showing a spacing of about 2 angstroms per electron, then a cubic centimeter of this fluid would have an equivalent charge of 10,000 Coulombs and require a very fundamental shielding technique. One of the perplexing mysteries presented in EVO measurements, and concomitantly the most useful quality in obtaining a large quantity of stable fluidized electrons, is this reduction of expressed charge while in a contained state of some yet undetermined category. Dzhunushaliev states the energy in such structures is tantamount to nuclear energies.

Potential Applications

From all of the above considerations, the HEP-EMP deployment device size range would likely extend from .22 caliber to 20mm using conventional ammunition rounds as a means for both sweeping an area to clear ensconced ordinance as well as for precision emplacement for a variety of uses.

Another potential application would be using HEP-EMP internal energy for self-propulsion of lightweight plastic cases as a form of electric stun gun having low lethality, higher accuracy and longer range than a wired Taser. It would seem ineffective to use any presently available form of body armor or shielding to impede the stunning effect of a HEP-EMP impact either on or near humans.

In yet another possible application, successive, multiple shots of HEP-EMP charges into one location would likely be capable of deep penetration into the target site with self-clearing borehole action and have a small area of surface destruction similar to that seen in 20-micrometer diameter EVO boreholes. If a cavity or bunker in the target zone were interdicted, there is a high probability of a propagation mode change into a wide-angle mode resembling a branching lightning discharge.

In past experiments using EVOs traveling in low pressure xenon gas, a form of optical EVO guidance was discovered in which the EVO generated an optical path projecting forward of its position and then followed the beam around optical reflectors placed in the path. Ken Shoulders recorded these brief observations in "EV-A Tale of Discovery" on page 8-47. This entry is copied as [Fig. 18] in Appendix I. Such observations strongly suggest that an electromagnetic guidance method for an unenclosed EVO packet will be devised for improved aiming accuracy including non line-of-sight targets.

Statement of Work

A statement of the work necessary to move this project from its present conceptual stage to a more advanced one for further analysis by an increased number of participants is outlined below:

Phenomenology Experiments with Diagnostics: Experiments conducted along the line of those described in the paper "Charge Clusters in Action" [2] will be performed demonstrating the deep penetration of the EVO entity into a solid along with the lack of heating of the ejected, fluidized material produced. Analysis will be performed on the borehole produced as well as the effluent ejected using both optical and electron microscopy means to determine a limited set of physical properties.

Microchip Damage from EVO Impact on Shield: Tests will be made on shielded semiconductors bombarded with small EVO structures. To do this, a small semiconductor communication chip, without lead wires attached to it, will be shielded and exposed to 20-micrometer EVOs. The unit will be tested both before and after the exposure to EVOs. The data obtained would suffice as a minimum test to show the type of damage expected. As a slightly advanced step, a CCD chip will also be exposed and tested to see if local areas are damaged corresponding to the EVO landing position on the shield.

Technique Study for Electron Fluid Production: Fluidization techniques for EVO droplets will be studied to help determine the most feasible method for immediate use as well as indicate a preferred future course. The studies will proceed along the lines of existing experimental work by others, primarily using the well-known Paul type of particle trap. The techniques studied would anticipate both accretion of EVO droplets into a stationary pool of fluid capable of being demonstrated as an HEP-EMP source as well as be used to analyze the resultant fluid. A description of one such configuration designed especially for low cost construction is shown in [8]. Many pertinent measurements on the properties of the collected fluid can be made using this same apparatus.

Theoretical Study of Fluidized Electrons and Breakdown Modes: Theoretical studies will be conducted on containment methods for electrons that are directed toward indicating the best modes for both containment and release of energy. In particular, the non-thermal, lightning-like propagation modes of dishevelment will be studied.

References

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[2] Background information on this field written by Ken Shoulders can be downloaded from:
http://www.svn.net/krscfs/

[3] G. A. Mesyats has written a variety of scientific reviews and books on electron clusters he calls Ectons. Among these books are:
Explosive Electron Emission by G. A. Mesyats, ISBN-7691-0881-5, 1998, URO-PRESS, Yekateringburg.

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