

Comments on APEC Saturday 18th January 2018

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Abstract

APEC – Alternative Propulsion Engineering Conference is run by Tim Ventura and is a forum that lets all-comers present their researches into fringe science concepts, though mainly those concerned with propulsion. This brief letter will write about two presentations – LENR and “Quantised Inertia”. I may comment on the other later presentations at some point. We find omissions in LENR experimental methodology and candidate theories based on current science but this wouldn’t exclude new science. We also find that McCulloch’s “Quantised Inertia” violates the Heisenberg Uncertainty Principle.

Introduction

APEC can be found here: [APEC: Alternative Propulsion Engineering Conference](#). It is commendable in giving people the chance to talk about fringe concepts or concepts frowned on by academia for lack of credentials of the presenters. Ultimately this is good for science, as progress is usually made on the continuum (and law of diminishing return) between knowing too little or knowing too much (and being devoid of ideas from over-education or a too conservative nature). It appeals to cussed/awkward-squad engineers and physicists who are head-strong enough to push forth their ideas against the mainstream and often, from the history of science, such people usher in revolutions. To be fair though, there is a lot of dross...

This report is on the conference available by this link: [APEC 1/18: Catalyzed Fusion, Quantised Inertia & Aether Theory](#)

1. Cold Fusion/LENR – Low Energy Nuclear Reactions/LANR – Lattice Assisted Nuclear Reactions/CMNS – Condensed Matter Nuclear Science

I have already written about this here: [Cold Fusion LENR/LANR/CMNS is back in the news. Is it Pathological Science or just barking up the wrong tree](#) (<https://vixra.org/abs/2401.0062>)

I will not dismiss “Cold Fusion” (or whatever it is – is it a *physical chemistry process*, like hydrogenation or phase change or even something new that is not nuclear?) because some very good people (some personally known to me but I shan’t divulge) have said there might be something there: sporadic reports come in of excess heat or odd isotope ratios.

The presentation on Saturday 18th January 2018 seemed to be given by a very sincere, nice and rational gentleman in laboratory surroundings. I came away thinking it was more of a sales talk than an exposition of scientific principles for those wishing to duplicate the findings:-

- No reaction equation showing reactants, products, energy balances, known processes, putative processes
- No mention experiments to isolate the effect but surrounding the effect with superfluous(?) or confusing equipment like *engines*. Reductionism helps science.
- No repeatable experiments or those headed to a consensus level of repeatability mentioned.
- Eye-candy graphics and video in the presentation showing a (pink) spark in some mixture of gas and no explanation as to how to reproduce the experiments.
- No clear video or accounts of experiments working. Vague “oh it ran for 4 hours on its own”.
- Eye-candy scale-up graphics showing power plants with no indication that the basic science is all sealed.
- Mention of things like the “Thunderstorm Generator”, a car running on purely atmospheric water vapour, or an engine that could continually cycle the water of combustion and somehow achieve over-unity or an experiment that started with hydrogen and somehow ended up with carbon and boron but no evidence presented or videos, materials reviewed by professionals (with no confirmation bias or axe to grind), no mass spectrometry or chemical qualitative/quantitative analysis.

I wrote about an Auger-like electron capture process initiated by x-rays from lattice relaxation [here](#) (and [here](#) too). I shall now onto the more theoretical aspects discussed in the presentation which dwelled on electron capture but this is at odds with theory because:-

- Electron capture (EC) is governed by the Weak Interaction. That’s just how it is (unless new science). The energetics of such processes are at the 100keV level rather than millions (MeV) of nuclear processes.
- Weak Interaction is a slow process/a rate limiting step (as chemists might say) that cannot possibly explain power densities alleged. EC has low probability.
- Wide ranging electron shell coherence/entanglement and even lattice interactions have no basis in the weak interaction because it is an extremely short-ranged force.
- Pressure/spacing not close enough for coherent overlap of nuclear wavefunctions for either weak or strong force range.
- Theory that neutron rich nuclei are formed from electron capture that then are compelled to form higher elements by the strong force, requires these nuclei to transport themselves over inter-atomic distances to combine with neighbours in the lattice (or gas or liquid separated by electron clouds) whilst being unstable and prone to beta emission.
- Given above, it is not clear how higher atomic numbers can easily be formed from “scaling the staircase” from hydrogen with electron capture, which reduces atomic number.
- No real account of how plasmoids were relevant to the discussion: how nuclear transmutation was achieved or how direct electrical conversion from these entities could be achieved.

- No explicit showing of how generation of products quantitatively lead to heat production. Surely Power = dm/dt.c² if it's nuclear? That would require incredibly sensitive mass measurements but aren't there proxies (neutrons, gamma but that is an old topic)?

2. "Quantised Inertia"

The next discussion was about "Quantised Inertia" and given by its proponent, Dr Mike McCulloch of Plymouth University, UK.

I have previously written about Mike McCulloch's work [here](#) (here [too](#)) briefly in the sense that it started my own enquiry about the Galactic Rotation problem and drew together my other thoughts about [Dark Energy](#) (here [too](#)) coming from my own [propulsion](#) project (here [too](#)); as [Sabine Hossenfelder](#) said, QI is based on shaky theory. Specifically I wrote that if he believes that inertia is caused by radiation pressure from an Unruh horizon, the effect is absolutely miniscule (take the Black Body temperature, plug into Stefan-Boltzmann law to work out intensity, work out the pressure/force from this, you get:

$$F = -\int_A P d\vec{A} \cdot \vec{n} = -\int_A \frac{2\pi^4 \hbar a^4}{15c^7} d\vec{A} \cdot \vec{n}, \quad \vec{n} = \frac{\vec{a}}{|\vec{a}|} \text{ where } F \text{ is your force, } a \text{ is your acceleration.}$$

Watching the new (18/01/2025) presentation drew out further absurdities: **Inertia was already quantised very early on in the history of Quantum Theory.** As soon as Planck suggested $E = \hbar\omega$ in 1900 and then Einstein explained the Photoelectric Effect *and* co-discovered (or brought together best/most coherently all the ideas kicking around at the time from Maxwell, Lorentz, Poincare, Fitzgerald regarding Special Relativity) in 1905, it only needed a 4-vector transformation to suggest $p = \hbar k$ (de Broglie 1924) – Special Relativity had already sealed that formula.

For a free, unbounded particle k is continuous (just as say the Hydrogen spectrum is continuous above the ionisation energy) and can tend to zero. There is no minimum acceleration figure.

Let's take McCulloch's hypothesis and see where it takes us:-

$$\text{If } p = \hbar k \text{ then } \frac{dp}{dt} = \hbar \frac{dk}{dt}$$

The wavenumber, k , would give us a length scale for the process and an idea of δt from the velocity. So let us write:-

$$\text{(eqn. 1) } ma = \hbar \frac{\Delta k}{\frac{1}{\Delta k} \cdot \frac{1}{v}} \text{ where } a \text{ is the acceleration, } v \text{ is the velocity and } \frac{1}{\Delta k} \text{ is the}$$

wavelength or length scale associated with the process changing the wavenumber; dividing this by the velocity gives the timescale.

If we assume constant acceleration (let alone a minimal “quantised acceleration” figure) we can write:-

(eqn. 2) $\frac{m}{\Delta t} = \hbar(\Delta k)^2 \Rightarrow \Delta k_{HUP} = \sqrt{\frac{m}{\hbar\Delta t}}$ ”HUP” for “Heisenberg Uncertainty Principle” and this would set a limit to how precisely we could measure a change in wavenumber (the number of waves per unit distance) given the mass of the particle and the time scale of the process.

If we substitute in Mike McCulloch’s suggested [minimal acceleration figure](#) (from his Blog, “Physics with an Edge”) of about $2 \times 10^{-10} \text{ m/s}^2$ into eqn. 1, we’d get,

$$\text{(eqn. 3) } \Delta k = \sqrt{\frac{2 \times 10^{-10} \text{ m}}{\hbar v}} \approx 10^{-5} \left[\sqrt{\text{meters} / \text{s}} \right] \sqrt{\frac{m}{\hbar v}}$$

$$\text{Taking the ratio of eqn. 2 and eqn. 3, } \frac{\Delta k_{HUP}}{\Delta k_{McCulloch}} = 10^5 \left[\text{s} / \sqrt{\text{meters}} \right] \sqrt{\frac{v}{\Delta t}}$$

Unity would mean the same results as the HUP. A value greater than 1 would mean that **Mike McCulloch’s hypothesis would measure more precisely than the Heisenberg Uncertainty Principle dictates** with no special artifice (such as statistical averaging): just set

$$\sqrt{\frac{v}{\Delta t}} > 10^{-5}$$

This is clearly absurd.

Other matters related to his putative propulsion device neglect all consideration of the scholarly Hidden Momentum literature base, as mentioned before: [here](#) (here [too](#)) and in my [propulsion](#) project (here [too](#)).

