

# **‘The Structured Atom Model & Transmutations’**

*Edwin Kaal*

# Introduction



# Presentation content

- Intro
- Recent Activities
- SAM recap
- Physics of SAM
- ICCF
- SAM and LENR
- Hypothesis
- LENR processes observed in nature
- Conclusion, Discussion & Summarizing

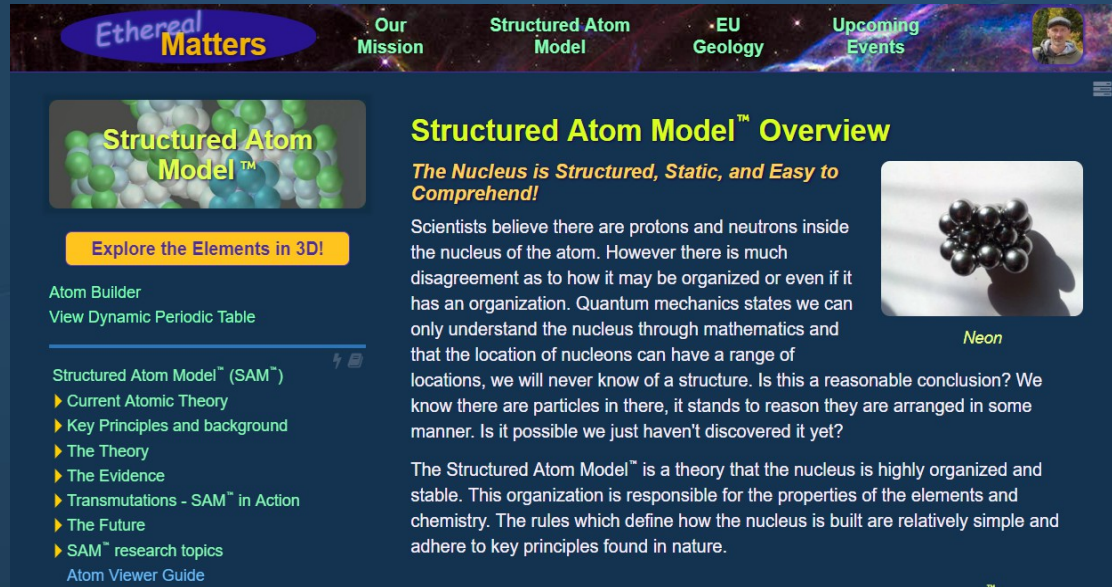
# How were the elements created?

<div>H 1</div>																	<div>He 2</div>						
<div>Li 3</div>	<div>Be 4</div>																	<div>B 5</div>	<div>C 6</div>	<div>N 7</div>	<div>O 8</div>	<div>F 9</div>	<div>Ne 10</div>
<div>Na 11</div>	<div>Mg 12</div>																	<div>Al 13</div>	<div>Si 14</div>	<div>P 15</div>	<div>S 16</div>	<div>Cl 17</div>	<div>Ar 18</div>
<div>K 19</div>	<div>Ca 20</div>	<div>Sc 21</div>	<div>Ti 22</div>	<div>V 23</div>	<div>Cr 24</div>	<div>Mn 25</div>	<div>Fe 26</div>	<div>Co 27</div>	<div>Ni 28</div>	<div>Cu 29</div>	<div>Zn 30</div>	<div>Ga 31</div>	<div>Ge 32</div>	<div>As 33</div>	<div>Se 34</div>	<div>Br 35</div>	<div>Kr 36</div>						
<div>Rb 37</div>	<div>Sr 38</div>	<div>Y 39</div>	<div>Zr 40</div>	<div>Nb 41</div>	<div>Mo 42</div>	<div>Tc 43</div>	<div>Ru 44</div>	<div>Rh 45</div>	<div>Pd 46</div>	<div>Ag 47</div>	<div>Cd 48</div>	<div>In 49</div>	<div>Sn 50</div>	<div>Sb 51</div>	<div>Te 52</div>	<div>I 53</div>	<div>Xe 54</div>						
<div>Cs 55</div>	<div>Ba 56</div>	<div></div>	<div>Hf 72</div>	<div>Ta 73</div>	<div>W 74</div>	<div>Re 75</div>	<div>Os 76</div>	<div>Ir 77</div>	<div>Pt 78</div>	<div>Au 79</div>	<div>Hg 80</div>	<div>Tl 81</div>	<div>Pb 82</div>	<div>Bi 83</div>	<div>Po 84</div>	<div>At 85</div>	<div>Rn 86</div>						
<div>Fr 87</div>	<div>Ra 88</div>																						
			<div>La 57</div>	<div>Ce 58</div>	<div>Pr 59</div>	<div>Nd 60</div>	<div>Pm 61</div>	<div>Sm 62</div>	<div>Eu 63</div>	<div>Gd 64</div>	<div>Tb 65</div>	<div>Dy 66</div>	<div>Ho 67</div>	<div>Er 68</div>	<div>Tm 69</div>	<div>Yb 70</div>	<div>Lu 71</div>						
			<div>Ac 89</div>	<div>Th 90</div>	<div>Pa 91</div>	<div>U 92</div>	<div>Np 93</div>	<div>Pu 94</div>	<div>Am 95</div>	<div>Cm 96</div>	<div>Bk 97</div>	<div>Cf 98</div>	<div>Es 99</div>	<div>Fm 100</div>	<div>Md 101</div>	<div>No 102</div>	<div>Lr 103</div>						

Creation of the elements as currently conceived



# Recent Activities



**Ethereal Matters** Our Mission Structured Atom Model EU Geology Upcoming Events

## Structured Atom Model™ Overview

***The Nucleus is Structured, Static, and Easy to Comprehend!***

Scientists believe there are protons and neutrons inside the nucleus of the atom. However there is much disagreement as to how it may be organized or even if it has an organization. Quantum mechanics states we can only understand the nucleus through mathematics and that the location of nucleons can have a range of locations, we will never know of a structure. Is this a reasonable conclusion? We know there are particles in there, it stands to reason they are arranged in some manner. Is it possible we just haven't discovered it yet?

The Structured Atom Model™ is a theory that the nucleus is highly organized and stable. This organization is responsible for the properties of the elements and chemistry. The rules which define how the nucleus is built are relatively simple and adhere to key principles found in nature.

**Neon**

Atom Builder  
View Dynamic Periodic Table

Structured Atom Model™ (SAM™)

- ▶ Current Atomic Theory
- ▶ Key Principles and background
- ▶ The Theory
- ▶ The Evidence
- ▶ Transmutations - SAM™ in Action
- ▶ The Future
- ▶ SAM™ research topics

Atom Viewer Guide

- Presentation at the EU2017 conference
- Website launched
- Attended & presented a poster at the ICCF-21 conference
- Transmutations was the prevailing topic

# Recent Activities

- The first 29 elements of the PTE released to the public, rest will follow
- An Atomizer-builder has been generated that can be used to (re)create any element or isotope
- Allowing the tooling to accurately depict elements and isotopes (reaction products)



Atomizer screenshot

## Recent Enhancements

- Added “inner electrons” placement (learning more about the nature and behavior of the nucleus: Increased understanding nuclear reactions)
- Added “extra neutrons” feature (ability to create unstable isotopes)
- Implemented a color coding based on conventional proton-neutron model (understanding (in)stability isotopes)
- Made it much faster, added a lot of background info and explanation and made many general improvements
- Atomizer-Viewer (29 elements) works on a Smart Phone

# Chemistry and Physics

## Nuclear Physics

## Atomic Physics

## Particle Physics

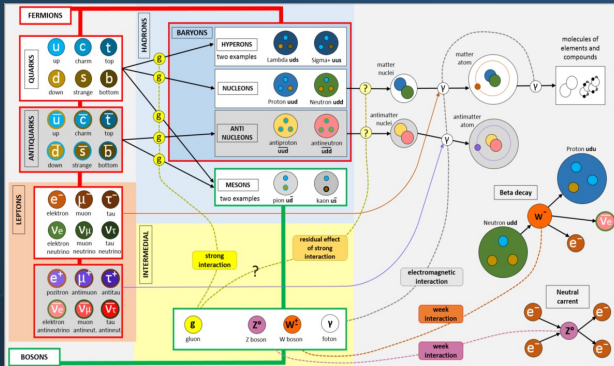
### Quantum Mechanics

## Structured Atom Model – SAM

## Chemistry

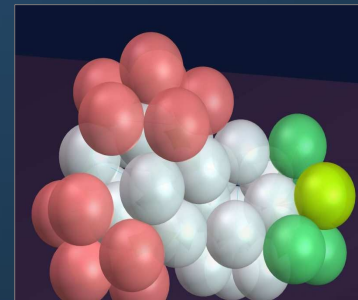
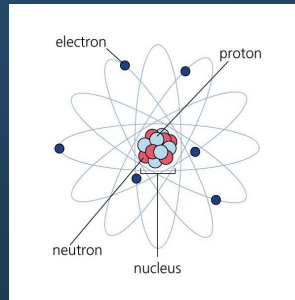
### Quantum Concepts

- Particles fading in and out of existence
- Over 200 particles identified
- Uncertainty Principle – cannot know both position and speed at the same time



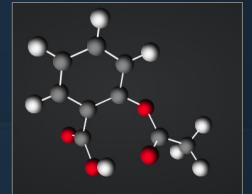
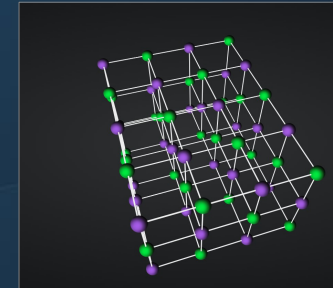
### Nuclear Reactions

- Exploding Stars
- Nuclear Power Plants
- Atom/Hydrogen Bomb
- Radioactive decay
- LENR Reactions



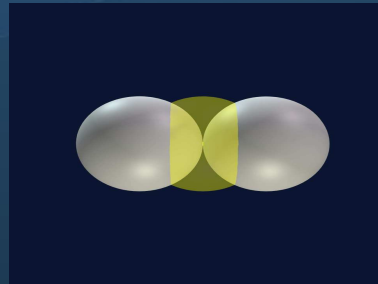
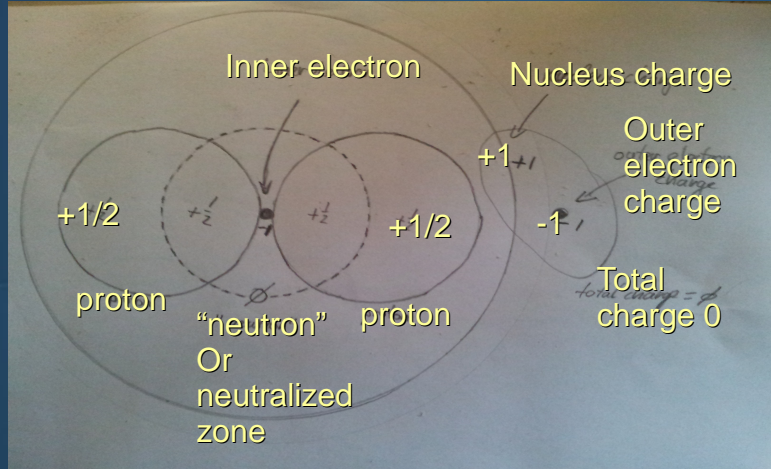
### Chemical Reactions

- Burning Candle
- Photosynthesis
- Cooking an Egg
- Rusting Iron
- Fireworks





# SAM recap – the components of the atom

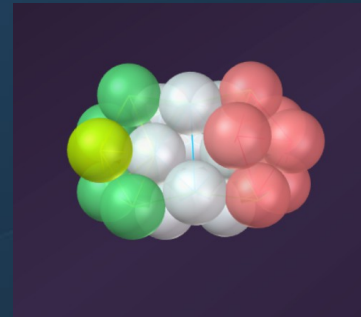
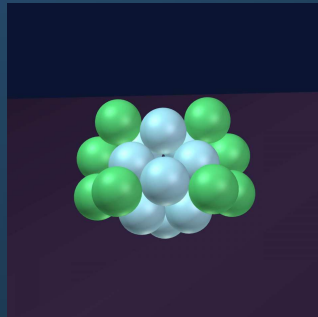
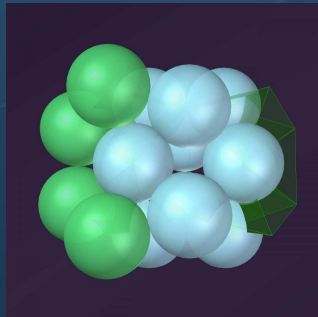
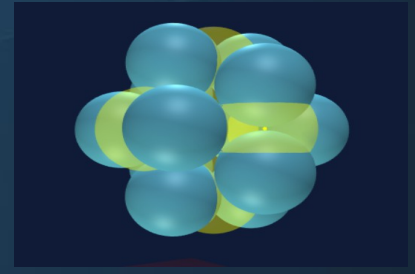
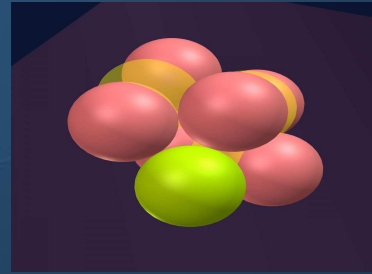
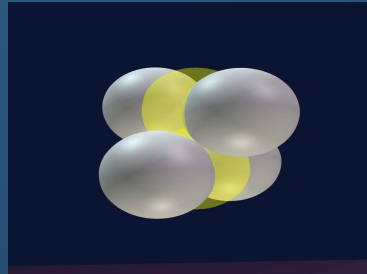
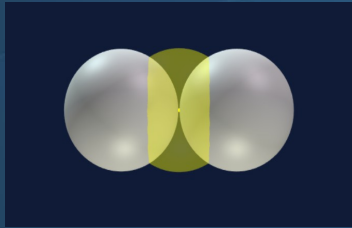


- New neutron / Deuterium /  $2H$  from the nucleus to the atom to a molecule.  
*This is the most important "building block" or "nucleus"*
- "But as to atomic energy, my experimental observations have shown that the process of disintegration is not accompanied by a liberation of such energy as might be expected from the present theories." (Tesla, 1931 NYT interview)



# The Nuclelets – Further Organization





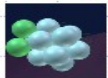
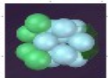
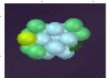
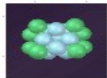







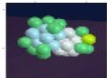
Nuclelets are specific groupings of geometrically shaped protons-electrons or rather made up of the Deuterium nuclelets as pointed out in the 'new neutron'.



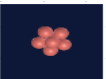

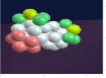
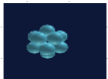
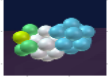
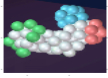


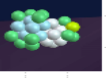
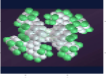
# SAM Linked to the Properties of the Elements

Cycle of 8  
The periods

+1   +2   +3   +4/-4   -3   -2   -1   0

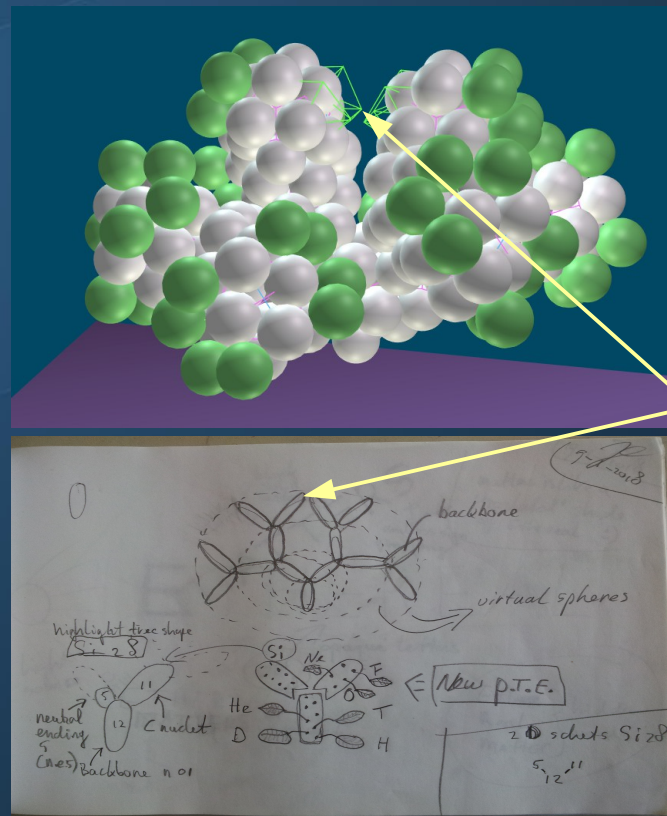
Li (7) 	Be (9) 	B (11) 	C (12) 	N (14) 	O (16) 	F (19) 	Ne (20) 
Na (23) 	Mg (24) 	Al (27) 	Si (28) 	P (31) 	S (32) 	Cl (35) 	Ar (36) 

Groups

<b>Alkali Metals Group I</b> Each has one active red 'lithium' <u>nucleus</u>  Li  Na  K	<b>Carbon Group XIV</b> Each has one active blue 'carbon' <u>nucleus</u>  C  Si  Ge	<b>Noble Gases Group XVIII</b> All endings are green which means they are neutral or inert.  He  Ne  Ar  Rn
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# The Shape of the Larger Elements

- The nucleus shows polarity
- Nuclets – The nucleus is constructed from (repeating) recognizable geometric groupings
- The (active) nuclets in combination with the larger structure (backbone) results in the properties of elements
- Each element is like a growth fragment of the 'tree'



Radon 222

top branches  
'interference point'

# The First 29 Elements Created by SAM

**Periodic Table of the Elements**  
(Released up to Copper)

Group I	Group II	Group III	Group IV	Group V	Group VI	Group VII	Group VIII	Group IX	Group X	Group XI	Group XII	Group XIII	Group XIV	Group XV	Group XVI	Group XVII	Group XVIII
H (1P)	N (P+e)	D / H(2P+1e)	T / H(3P+2e)													He (3P+1e)	He (4p+2e)
Li (7)	Be (9)											B (11)	C (12)	N (14)	O (16)	F (19)	Ne (20)
Na (23)	Mg (24)											Al (27)	Si (28)	P (31)	S (32)	Cl (35)	Ar (36)
K (39)	Ca (40)	Sc (45)	Ti (46)	V (51)	Cr (52)	Mg (55)	Fe (56)	Co (57)	Ni (58)	Cu (63)							

*"We have a duality which we call a proton-electron pair with the electrostatic force acting between them. This force is the causal mechanism for the principle of densest packing that creates geometric shapes based on the platonic solids. These geometric shapes in a specific ordered sequence and number, create all the elements and their isotopes."*

For more information and background visit the page  
<https://etherealmatters.org/sam>

# The Atom According to SAM:

- Is based on the proton – electron duality
- Is structured according to specific rules (of growth) and shapes
- Shows that the properties of the elements are dictated by the structure of the nucleus
- Is static in nature
- Tends to resist absorption of energy, reverting to its ground-state, if possible
- Has no need for a strong force
- Does not need mathematical equations to depict the nucleus



# Presentation of SAM at ICCF-21

- About a month ago the SAM group visited the ICCF-21 conference at the CSU with the intention of promoting SAM by presenting a poster and to learn about the LENR field



**The Structured Atom Model - SAM™**

ICC-21 conference, Fort Collins, Colorado USA, 8-9 June, 2018

**Summary of the Structured Atom Model (SAM)**  
SAM shows how the periodic table grows in a logical, tree-like fashion with natural structural groups for the elements. With the SAM, we show that neighboring atoms and isotopes exhibit a structural relationship which is very much predictable, logical and verifiable.

**Major Postulations of SAM**

- The SAM models the nucleus in accordance with properties found in the Periodic Table of the Elements (PTE) e.g. valence, nucleon/proton ratio, atomic weight, stability, nuclear spin, etc.
- SAM postulates there must be organization and structure to the nucleus and this structure determines the properties of the elements.
- Stable elements have a stable structure. The nucleus does not change without an external influence.
- The SAM is based on three simple concepts: (i) a simple organizing (selecting) force, (ii) the principle of demand packing, and (iii) the banding of values to create specific geometric arrangements: the periodic table.
- The nucleus is made from **clusters of protons** which we have named **nuclei**.
- Nuclei continue in a tree-like fashion to create the larger elements. **Fission reactions** can be explained by comparing nuclei together. **Fission reactions** are explained by breaking nuclei apart.
- The SAM is predictive, e.g. the geometry of the nucleus determines whether an element is a metal, halogen or noble gas for example.
- The SAM shows why some elements are stable, how they decay into other elements or isotopes, and why elements are abundant or rare.
- The SAM is a structural, not a mathematical theory – the basic theory is simple, intuitive and well-suited for educational purposes. Being able to build the nucleus with magnets, held in your hands, and repeat it in beauty brings the fun back to chemistry!

**The New Neutron**

- A free neutron is an unstable isotope and cannot exist by itself. When removed from the nucleus a neutron spontaneously decays into a proton and an electron within 15 minutes.
- The SAM defines the free neutron as an unstable proton-electron pair that is held together unconditionally – no weak force is required.
- The SAM defines the **nuclear neutron** as a proton that shares its electron with other protons in the nucleus – most often with one other proton in a **Deuteron pair**.
- Nuclear electrons prevent the protons from repelling each other and hold the nucleus together – there is no repulsion among them.
- The nuclear electrons can be found in several arrangements but the most prevalent form is Deuteron-like protons with an electron in between. **This is the primary building block of atoms.**
- Nuclear electrons have been theorized for most of the 20th century, but were voted down at the 1932 Solvay conference in favor of the Bohr model.

**The SAM explains the periodicity of the Periodic Table**  
The periodic table is arranged such that elements with similar properties are in the same column or group. The SAM shows why – elements of the same group have the same active ending.

**Software Tools**

- Atom Audio Builder** – A program which allows the SAM to be audibly heard by the elements. This will help in research and demonstrate the predictability of the SAM. (largely completed)
- 3D Periodic Table** – Rearranges the PTE to show different growth paths of the elements.
- The Chemist** – A program which demonstrates how SAM can predict chemical reactions through geometry.
- The Alchemist / Separator** – Shows how elements change in fusion and fission reactions. Needed to predict daily LENR reactions.
- Atom Educator** – A program to teach chemistry and physics.

**Ethereal Matters Mission**  
The Ethereal Matters mission is focused on bringing scientists together to discuss, understand and advance the Structured Atom Model. We provide interactive web-based software tools which demonstrate the theory in 3D for research and educational purposes.

**Future Research**

- Identify structure of missing elements 25 completed, 30+ more under development.
- Determine how nuclear structure dictates the nuclear spin.
- Identify potential LENR reactions.
- Explore possible missing elements.
- Determine location and behavior of nuclear electrons.
- Research how nuclear structure determines the color, design, odors and function chemistry.

**SAM Demonstrates Four Different Types of Nuclear Reactions**

**Radioactive Decay**  
Electron emission from the nucleus.  
Tritium T32 decays to Helium He4 (He3).  
Carbon C14 decays to Nitrogen N14.  
Carbon C14 decays to Nitrogen N14.

**Electron and Proton Capture**  
Electron capture: Nitrogen N14 + neutron (n) → Nitrogen N15 + Carbon C13.  
Proton capture: Potassium K39 + neutron (n) → Calcium Ca40.  
Electron capture: Potassium K39 + electron (e) → Calcium Ca38.  
Proton capture: Potassium K39 + proton (p) → Calcium Ca40.

**Hot Fusion**  
Electron state change (inner + outer electron).  
Tritium T32 + Deuterium D2 → Helium He4 + free neutron (n).  
Helium He3 + Deuterium D2 → Helium He4 + proton (p).  
Helium He3 + Deuterium D2 → Helium He4 + proton (p).

**Cold Fusion - LENR**  
Combining the Deuteron nuclei – the change of inner or outer electron state.  
Deuterium D2 + Deuterium D2 → Helium He4.  
Carbon C12 + Helium He4 → Oxygen O16.

**Periodic Table of the Elements**  
(Revised to fit Copper)

**What do we gain with the SAM?**  
The SAM shows the observed values and properties of the elements and the elements. The model allows us to understand the elements in a new group manner.

**Ethereal Matters LLC**  
J.E. Kail (Edo)  
James A. Sorenson  
Jan G. Ereming

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The Structured Atom Model™ (SAM™) was developed by Edo. All experiments here are generated with the Atom Audio Builder module developed by James.

# ICCF-21

Conference room

- Experimental data presentations
- Hydrogen or Deuterium fusion
- Transmutations in Nickel or Palladium systems trans-mutating into Copper and Silver respectively
- During a special session that dealt specifically with the atomic structure and concepts like “binding energy,” we learned that since 2016 - a structure for the nucleus **is** now acknowledged

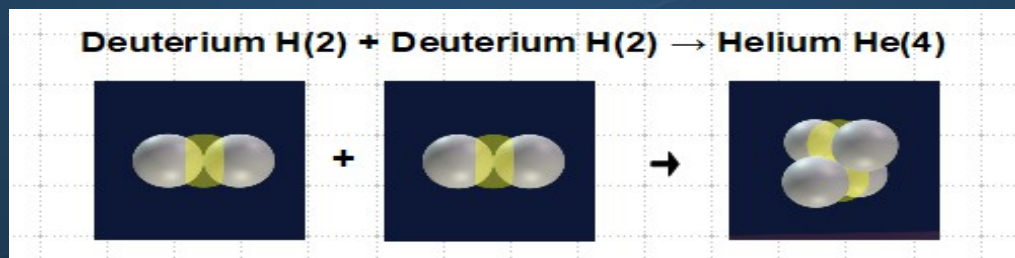


# Issues in LENR Preventing a Break-Through

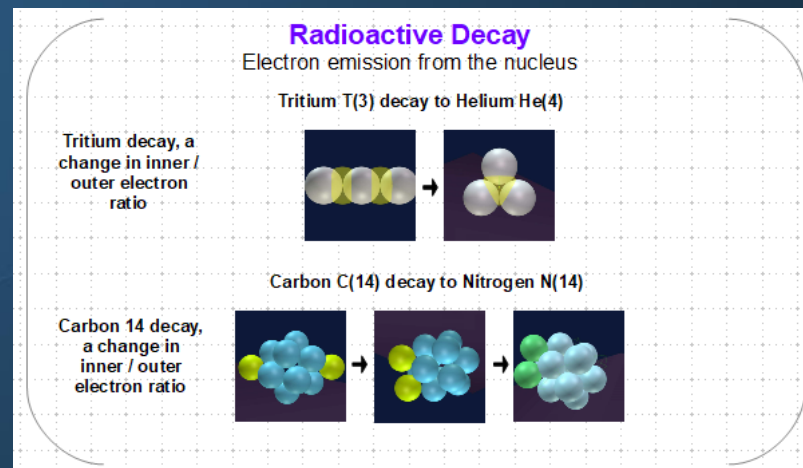
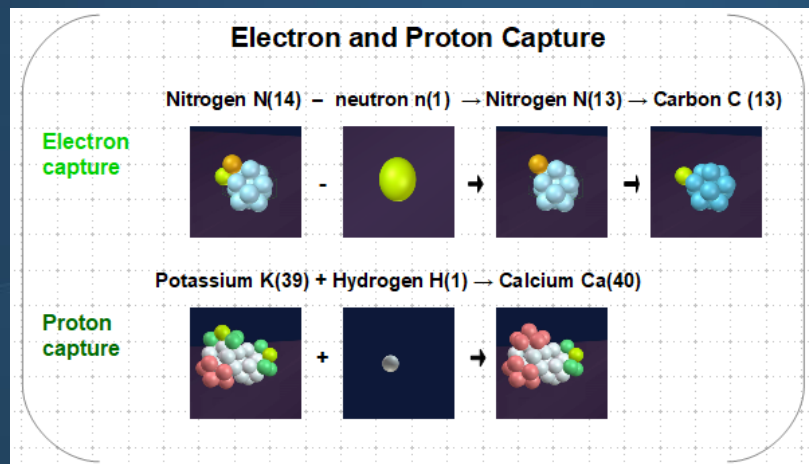
- Lack of controllability - control of the electrodes proves difficult
- Repeatability is not always assured
- No theoretical model - reactions are not understood

# Stanley Pons & Martin Fleischmann

Yet the original experiment by Pons and Fleischmann (1989) has been recreated by Melvin Miles (1991) in such a way that it is / should be indisputable. Excess **Heat and He4** production from D2 is precisely correlated.



# SAM & LENR - Nuclear Reactions

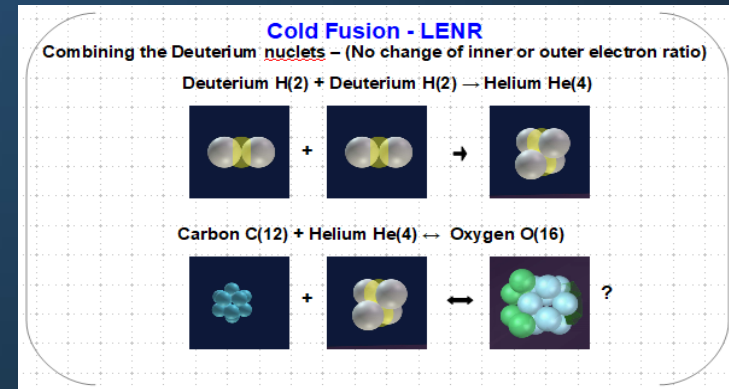
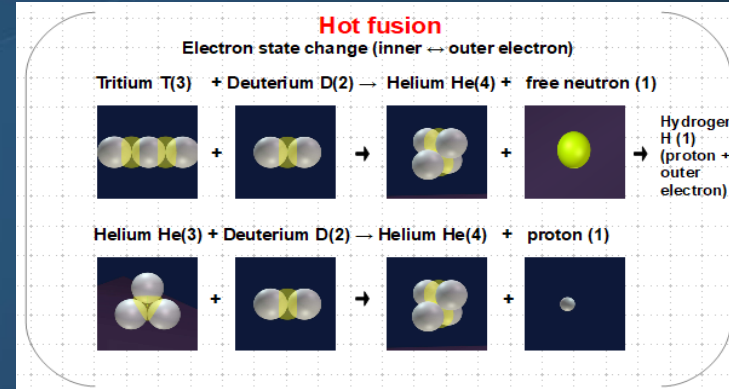


We learned that these experiments are solid, but that the breakthrough that could cause LENR to be accepted, remains elusive



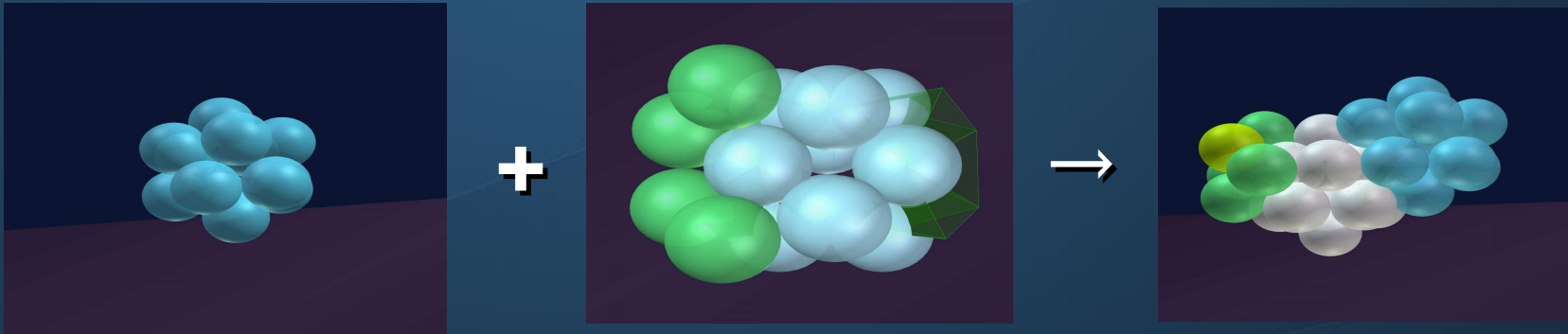
# Nuclear Reactions

We learned that we can differentiate between hot and cold fusion and that the SAM model accounts for and is able to depict nuclear reaction products..



# The Electric Component - Linking Pin

- The ICCF community is trying to find a model that would predict reactions (LENR) and therefore help in achieving a break-through.
- Example of suspected reaction taking place in geology



- This is important for both the EU and the LENR communities

# Transmutations in Nature

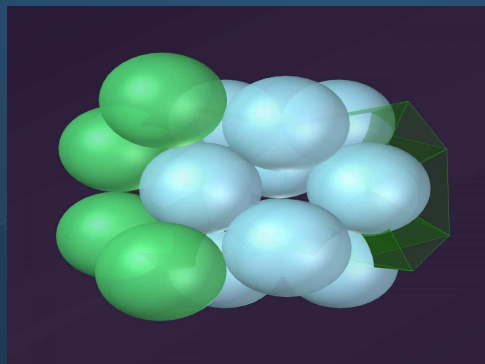
- Nature provides many hints of transmutations taking place
- Kervran – biological transmutation such as  
 $K39 + H \rightarrow Ca40$
- Peter Mungo Jupp – instant petrification  
Petrified animals imply instant events
- James Sorensen will be narrating during our tour to the Cheddar Canyon, explaining Geology through “electric glasses”
- Too many to name when one starts looking for transmutations...

## The Oxygen Group.... Sulfur

The Oxygen group is peculiar in that Oxygen doesn't seem to fit in this group that it's named after. When we examine this closer we can see that Sulfur has the right numbers ( $2 * 16 = 32$ ) to be a combination of two Oxygens.

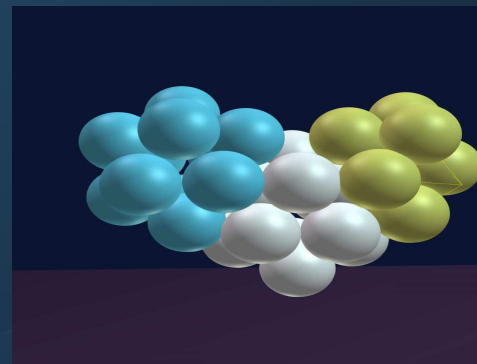
Assuming this takes place, what would be the result?

16  
protons



Oxygen

32  
protons

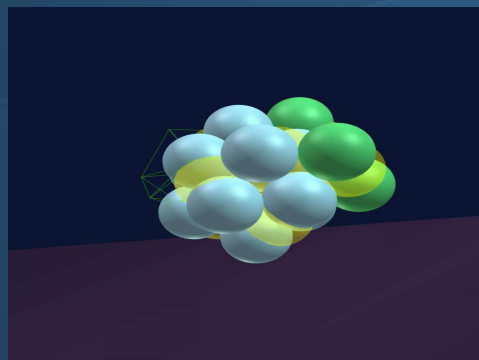


Sulfur

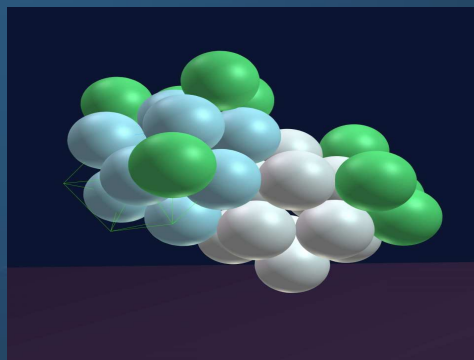
# Oxygen Group and the Elements

Oxygen

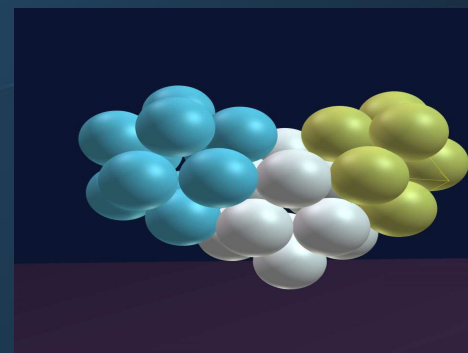
2\*



Sulfur (2 fused O)  
In-between state?



Sulfur



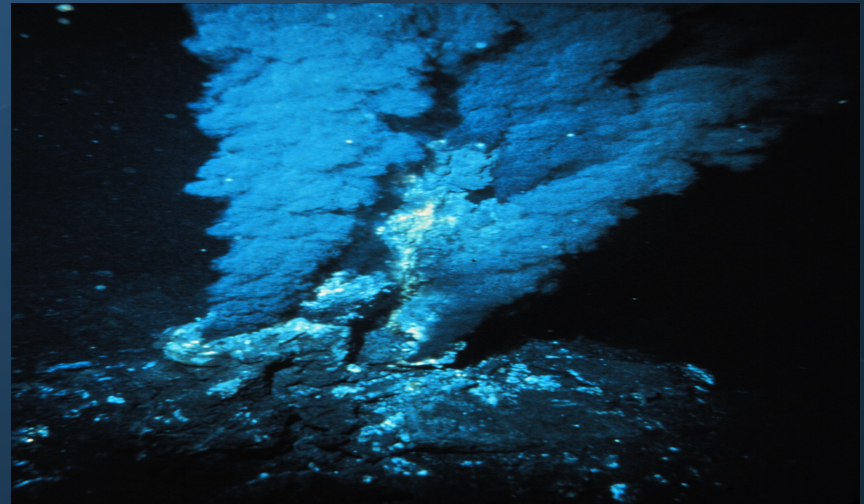
2016 → S32 ? (# protons & neutrons / inner electron are the same before and after)



# Hypothesis

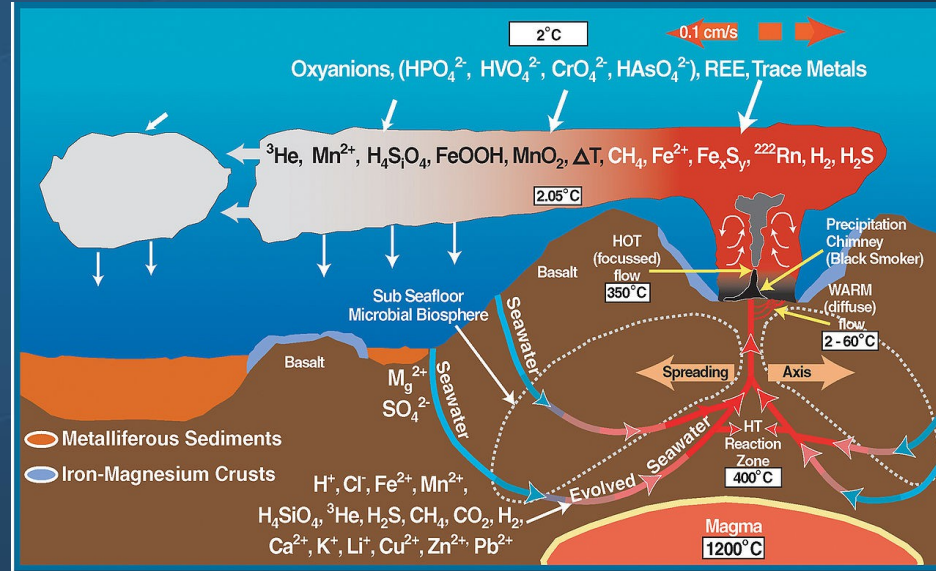
Could it be that, the (heavier) elements are created in situ on the earth itself through what is known as LENR, and that these processes are the cause for geological processes such as volcanoes and explain the abundance of the elements?

black smoker



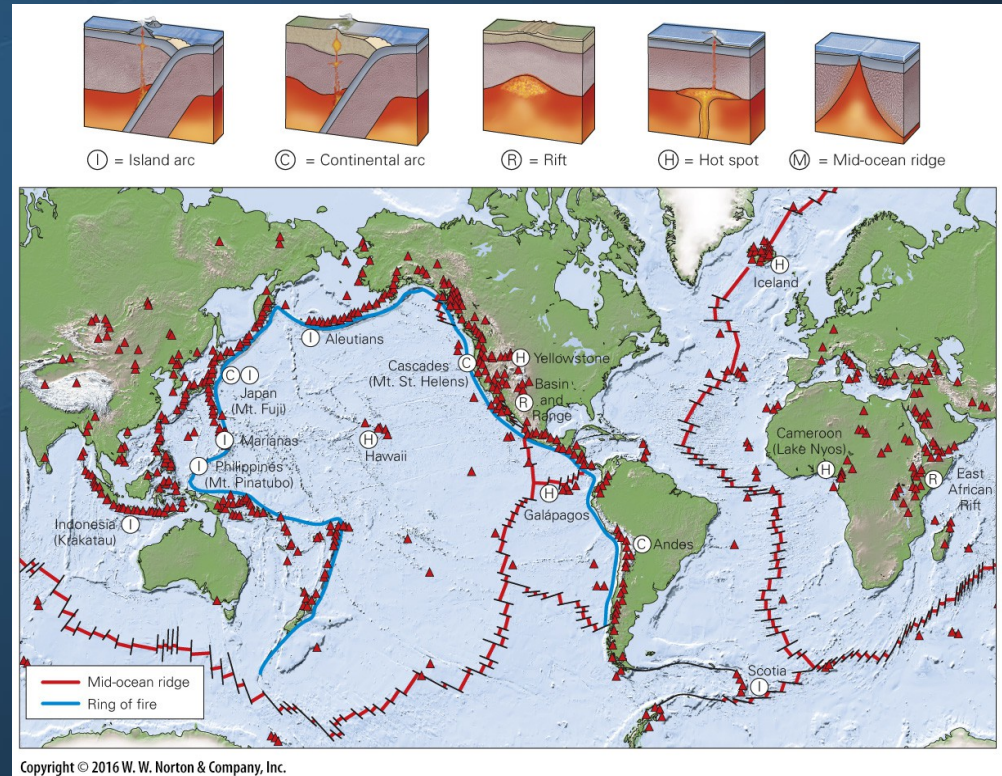
# Mid Oceanic Ridges – The Conventional Story

- The ocean's contain at least a million volcanoes and many more vents (black smokers)
- High abundance of Sulfur. The S tends to rise up as  $\text{H}_2\text{O}$ , S,  $\text{SO}_2$  etc.
- The **Mohorovičić** discontinuity on average 35 Km deep +/- 500 m thick
- The outer core is suspected to be mostly Iron, but magmas are silicate liquids. Thus, magmas do NOT come from the molten outer core of the earth



# Volcanoes / Black Smokers / Mid-Oceanic Ridges

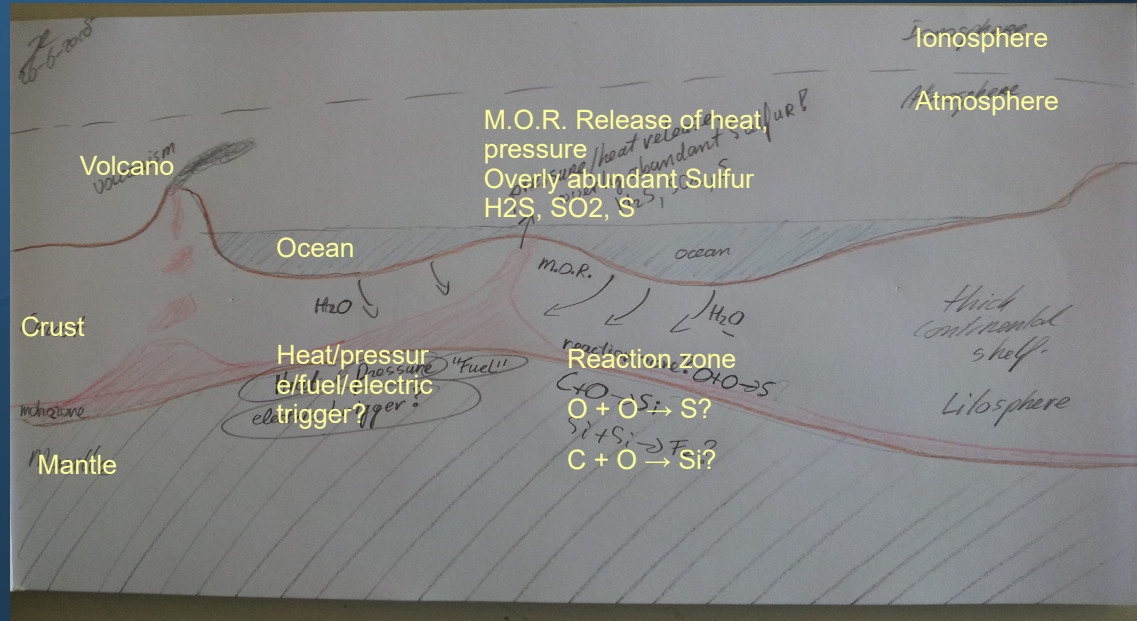
- What if we put the LENR reactions into this picture?
- Heat is produced, Oxygen is transported into the bowels of the earth, Sulfur is available in large quantities! Volcanoes and black smokers are the result and they are concentrated in certain places





# Hydro-cycle

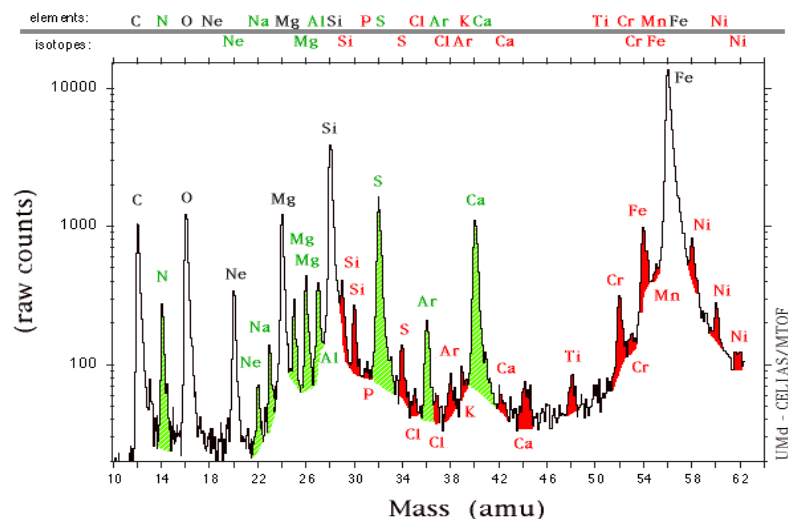
- LENR reaction and heat creation, creation of Si ! ( $\text{SiO}_2$ ) and lots of other products. And the lighter elements are brought to the surface. The Si (O) remains and increases rock material.
- $\text{O} + \text{O} \rightarrow \text{S} + \text{heat} ?$
- $\text{C} + \text{O} \rightarrow \text{Si} + \text{heat} ?$
- Exactly how all of this works needs a lot of research



# Solar Wind

## Chemical composition solar wind

Solar Wind Elements/Isotopes Observed by CELIAS MTOF



Solar wind has Oxygen  
as third abundant element  
Oxygen & Hydrogen  
makes water!

VON STEIGER ET AL.: SOLAR WIND COMPOSITION

**Table 1.** Abundance Ratios Relative to Oxygen Obtained With Ulysses/SWICS During the Four ~300-Day Periods Defined in Plate 1<sup>a</sup>

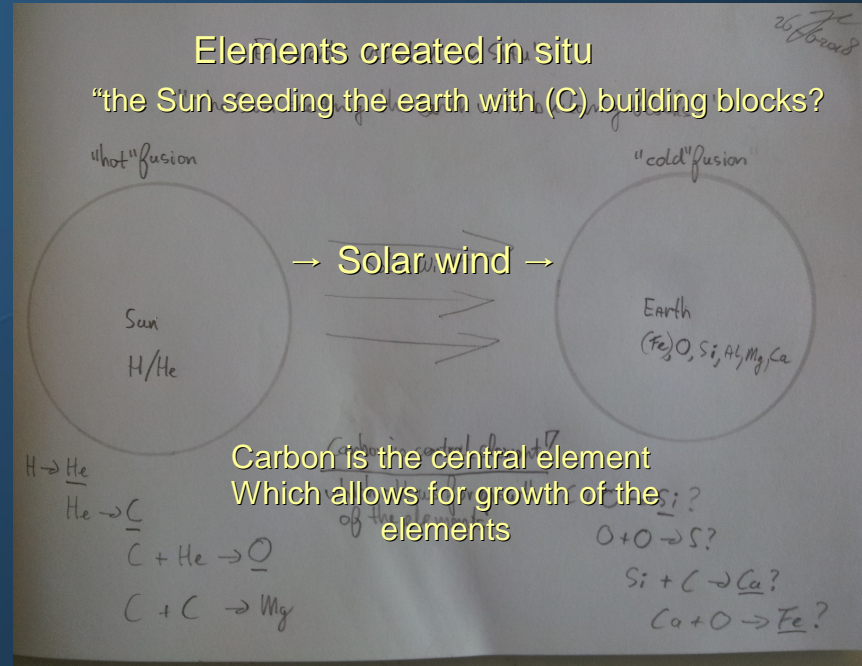
	FIP	"Max"	"South"	"North"	"Min"	Phot.
He	24.59	95.9 ± 35.1	72.7 ± 7.9	73.6 ± 8.2	84.0 ± 33.0	126
C	11.26	0.670 ± 0.071	0.683 ± 0.040	0.703 ± 0.037	0.670 ± 0.086	0.489
N	14.53	0.069 ± 0.038	0.111 ± 0.022	0.116 ± 0.021	0.088 ± 0.035	0.123
O	13.62	1 ± 0	1 ± 0	1 ± 0	1 ± 0	1
Ne	21.56	0.091 ± 0.025	0.082 ± 0.013	0.084 ± 0.013	0.104 ± 0.027	0.178
Mg	7.65	0.147 ± 0.045	0.105 ± 0.025	0.108 ± 0.022	0.143 ± 0.055	0.0560
Si	8.15	0.167 ± 0.047	0.115 ± 0.023	0.102 ± 0.023	0.132 ± 0.042	0.0525
S	10.36	0.049 ± 0.016	0.056 ± 0.013	0.051 ± 0.014	0.051 ± 0.021	0.0316
Fe	7.87	0.120 ± 0.039	0.092 ± 0.017	0.081 ± 0.014	0.106 ± 0.044	0.0468

<sup>a</sup>The numbers denote averages of daily values with their 1-σ variability. Photospheric (Phot.) values are from *Grevesse and Sauval* [1998]. SWICS, Solar Wind Ion Composition Spectrometer; FIP, first ionization potential.



# From the Sun to the Earth

- Sun: Hydrogen into Helium, Carbon and fuses those into Oxygen? Solar wind has Oxygen as third most abundant element  
 $4\text{H} \rightarrow \text{He4}$  /  $3\text{He4} \rightarrow \text{C12}$   
 $\text{C12} + \text{He4} \rightarrow \text{O16}$
- Earth collects water and turns the oxygen into building blocks for further fusion processes?  
 $\text{C12} + \text{O16} \rightarrow \text{Si28} + \text{C12} \rightarrow \text{Ca40}$   
 $\text{Ca40} + \text{O16} \rightarrow \text{Fe56}$
- Is this connected to geological activity?  
Heat release of LENR type reactions  
and creation of earth minerals by using liquid water?



# Conclusions

- In Nature, “Cold Fusion” seems to be happening everywhere, without significant gamma ray production. They can be both endothermic & exothermic. Experiments are showing this to be the case (LENR / Krivitsky / Cook). The one missing factor is **understanding**, which would provide predictability and controllability.
- The SAM model can help us better understand these processes and help fill in this missing piece of the puzzle. When we better understand the reactions, we could potentially create new LENR technologies for energy production for example, or the creation of certain elements and isotopes. Nature seems to do it all the time!
- The elements are created more or less in situ!

# Discussion

- Much remains uncertain, many new questions
- A break-through seems to be close
- Need collaboration between the various stake-holders:
  - Theorists
  - Experimentalists
  - Naturalists
- Only by working together will we succeed. The LENR field is a promising one and one that I believe is in concert with the EU paradigm. The SAM model can be the conduit between the two...

# General Recommendations

- More collaboration
- Crossing boundaries between disciplines (scientific fields)
- Need for a new understanding / paradigm shift and the will to do that..
- Attract more investments, without this, progress is slow at best
- Attention / exposure, “How to reach the mainstream”?

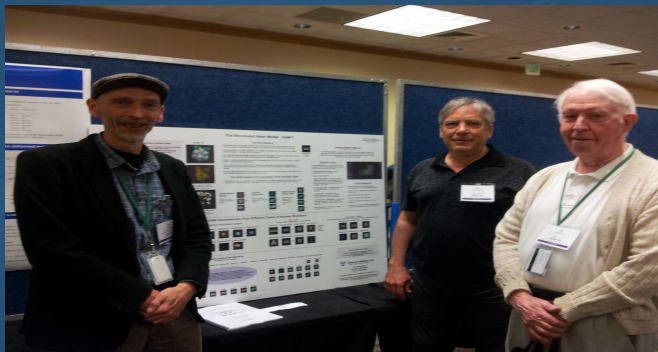
# Presentation Objectives

- Inspired others to explore the idea of (in-situ) creation of the elements, differently from the standard model
- Showed the potential of SAM and its utility for learning, understanding and education
- Emphasized the need for a suitable physical model for the atom
- Informed those interested about what “we have been up to”... so far



# Thank You on Behalf of the Team

The team:



Edo Kaal  
James Sorensen  
Jan Emming

**With special thanks to!**

Adrian Gilbert  
Lucy Wyatt

And to all the others out there who  
helped in their own way to  
advance the model

# The Structured Atom Model and Transmutations

EU 2018, Bath, U.K.

A PROPOSAL FOR FUSION PROCESSES ON EARTH

Edo Kaal