FOR GENERAL PUBLIC CURIOSITY: UNIFIED FIELD GEOMETRY FOR FIRST TEN ELEMENTS OF MENDELEEV PERIODIC TABLE BEGINNING WITH PHASE AND STATE.

PLANE GEOMETRY OF A UNIFIED FIELD PROPERTIES

Began 1ST Q 2017

A CSDA parabola curve has two metrics for curve analytics. The first metric would be that exploration of gravity field energy curves found in human macro-infinity. The second would be a symmetry congruent relative parabola curve I fit into human micro-infinity to study nuclear mechanical energy curves. To acquire a simplistic start for unification of fields we must start with a geometry. Field geometries have one major problem, seeing. Classic mechanics got us started with gravity field mechanics. We could see and measure with time the motion of our solar group, allowing a first rung of knowledge to be established about the fields with which we live. Electricity and magnetism played games. One field being a perceived apparition in macro space (magnets), the other part hidden in micro space until Maxwell combined them into electromagnetic particle-wave theory propagation of light. Nuclear level Quantum assessment would have similar confusing difficulty. New methods of diagram (Feynman), new theories, (String), and remarkable new (Computer enabled animated, graphical mathematics), would all make the climb on the incline of field unification knowledge ever so steep. I decided to return to a simple description of commonality threading the elements together. Back to ancient Greece and a look at element configuration as (EARTH, WIND, FIRE) aka solid, liquid, and gas.

Constructing changing phase and state of first ten elements (atoms) with Plane Parametric Geometry of Euclid and Apollonius

BEGGININGS

I want to get past the complications we've put together concerning an atom, set aside momentarily anything Quantum since I don't understand it, and look again at the Neil Bohr/Rutherford atom (1913). This model gave birth to the name Quantum Theory. By applying electromagnetic philosophy metrics (of visible light) as quantified packets of energy needed to promote electron position to new levels (orbitals) with respect to the nucleus, hence Quanta. By light metrics I reference a leaf. Midnight; a tree is a dark shadow except those spots of night sky. Come sunrise, we realize constituent shape and color of many leaves comprising a tree. All due to sunlight energy stimulating electron structure of a leaf, tree, et al.

Instead of distributing the electron collective into distinct orbits and shells, I group their (-) charge field as a single entity represented as a circle. Using nuclear Z# weight as radius of the circle gives specific identity to my constructions. Quantum physics studies constituents of nuclear composition, as well as the forces enabling nuclear assembly. I intent to build a standard model of an atom and study the why and how these forces might experience physical change of state.

21st century information is readily available to anyone with curiosity to delve a little deeper. Atomic orbitals (21st century view) is an example of where to go to see quantum mechanics at work.

https://en.wikipedia.org/wiki/Atomic_orbital ; will lead to this diagram of electron configuration.

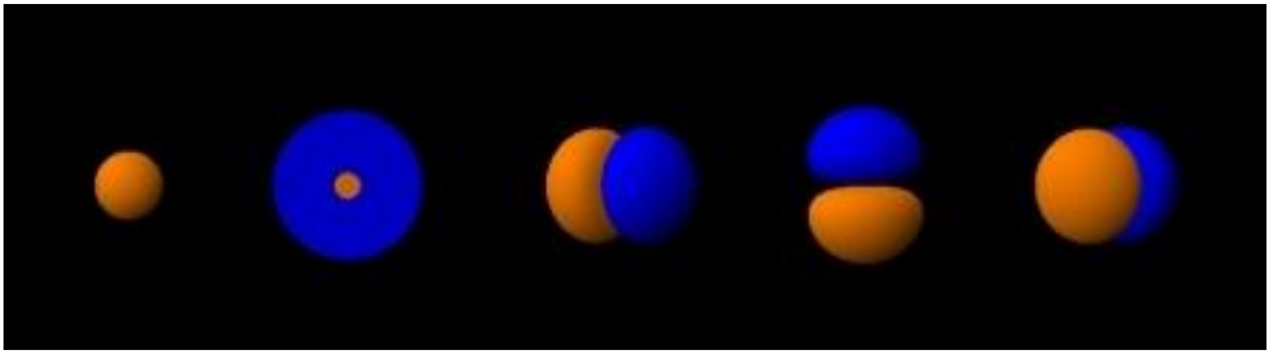


Figure 1: The shapes of the first five atomic orbitals are: 1s, 2s, 2px, 2py, and 2pz. The two colors show the phase or sign of the wave function in each region. Copied from Wikipedia Common Elements at site listed above.

Note the shell/orbital configuration of figure1 is at three levels, (1s; 2s; and 2p) up to first ten of the table. I intend to build these first ten elements using a standard model description, starting with 1s, hydrogen (Z#1; H_1). The first ten elements would be six gas and four solid and register with these three levels of electron configuration. To review composition and electron shell configuration of elements use Wikipedia Dynamic Periodic Table:
http://www.ptable.com/

Each orbital must be occupied by two electrons. An orbital need be complete with two electrons before new electron orbitals can be constructed.

Table 1: orbital map of first ten elements.

Orbital	Electron sum	element	
1s	2	H^1, He^2	1+1 = 2
2s	2	Li^3, Be^4	2+1+1 = 4
2p	2p…xaxes = 2 2p…yaxes = 2 2p…zaxes = 2	B^5, C^6, N^7, O^8, F^9, Ne^{10}	2p(x) = 4+2 = 6 2p(y) = 6+2 = 8 2p(z) = 8+2 = 10

First ten elements as phase: GAS; Hydrogen, Helium, Nitrogen, Oxygen, Fluorine, and Neon. SOLID; Lithium, Boron, Beryllium, and Carbon. No liquid.

I intend to develop a geometry for phase change or more specifically, change of state for the first ten elements at the atom level as only plane geometry can do. I pattern my phase exploration after refrigeration phenomena. Of particular importance, would be the energy required to pass from one state to the next state. Refrigeration phenomena involves only two states (liquid ↔ gas). The physical alteration of refrigerant gas to liquid and back to gas is the mechanics of cool comfortable air, or cold preserving air of our refrigerators.

Refrigeration of a closed zone of temperature.

Let a closure be a room or refrigerator. A refrigeration system uses the zone air as heat source to boil refrigerant liquid back to gas. Zone air is drawn across coils containing liquid refrigerant, heat of the air is absorbed into the colder coils boiling liquid refrigerant back to gas. Cooler air is returned back to zone less a specific quantity of heat. Refrigeration motors and compressors recycle this event over and over again until a thermostat set point is satisfied.

Someone took the time and effort to measure energy required to raise a volume of water, degree by degree, and found a remarkable fact concerning required energy to pass from one phase to the next.
http://hyperphysics.phy-astr.gsu.edu/hbase/thermo/phase.html

Of primary interest is the plateau part of phase change energy graph for water. That heat applied bringing about temperature change in water *between phase plateau* is known as sensible heat because we can measure environ change with a thermometer. Sensible heat can be construed as one unit of heat metered as a BTU calorie, added *or* removed, to gain *or* lose one-degree water temperature.

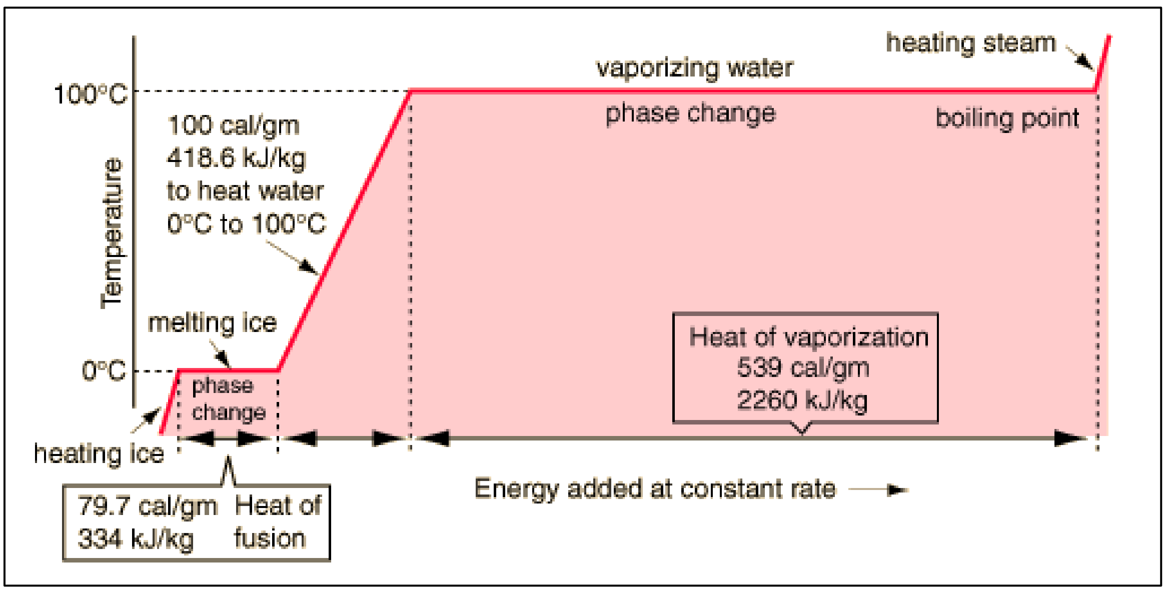


Figure 2: basic energy input to take water from ice to steam. Notice plateau where large amounts of energy goes in without change in temperature of H2O from ice to liquid and liquid to steam.

To move one degree up or down *between* plateaus will require one calorie in or out to get the job done.

Direct attention to both plateaus. From the beginning to end of either plateau heat energy is still being absorbed or relinquished. This heat is called latent heat. Latent heat cannot be sensed as it is required by the perceived state of an atom (solid, liquid, gas) to transition condition of state. Latent heat is required energy needed to leap or fall between the bounds of perceived state. We can say latent heat, to be measured, requires an internal nuclear sized thermometer. I use parametric **CSDA** geometry to construct an internal latent heat thermometer.

I used water as example, but phase change requires significant external (sensible) and internal (latent) energy, to alter state for all elements. To develop an internal thermometer, we begin with Lithium (Z# 3). lithium&heat .ggb (2018)

Atom level phase change

We begin phase geometry with a standard model of nucleus and (Z#3 ecloud). Each model will construct phase stability using spin axis relativity with one GeoGebra dynamic latent heat thermometer to register phase transition event.

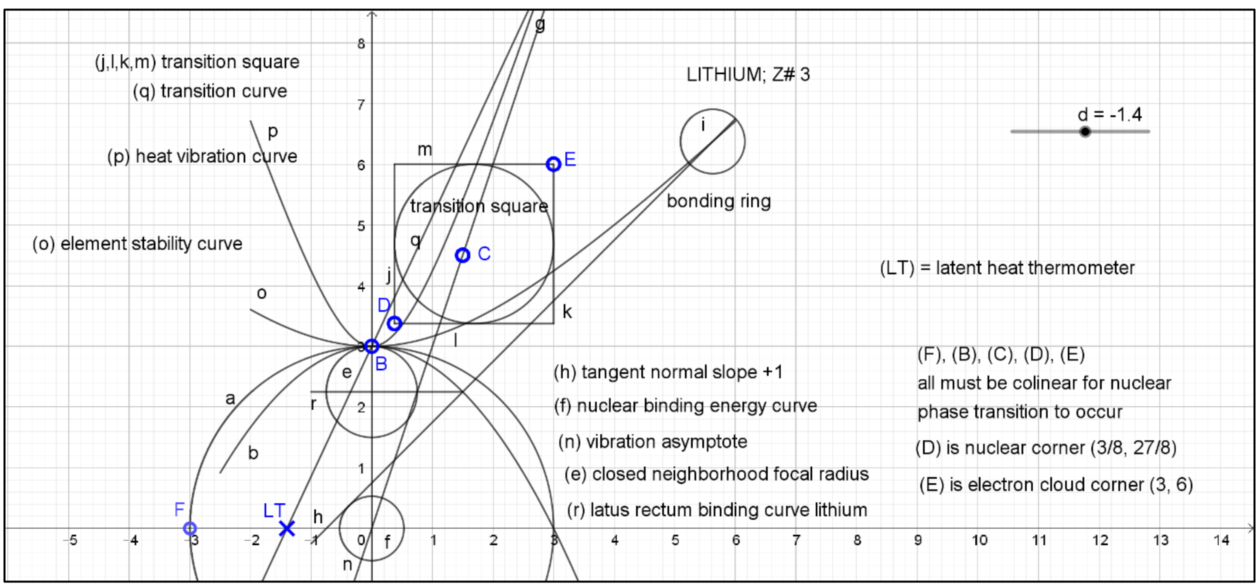


Figure 1: Li (Z#3). Let latent heat thermometer (LT) be somewhere between nuclear spin stability (f) and diameter end point (F) on rotation accretion diameter.

- State stability and Latent Heat Thermometer: state stable *is* the spin axis and possess three physical perception, solid, liquid, and gas. State stable happens thrice; solid, liquid, and gas; each state held separate by relative nuclear stability with respect to collective environ temperature! Change of nuclear stability requires latent heat thermometer (LT) to move *between* nuclear center as spin stability, (independent of heat phenomena) and rotation limits of the (π↔2π) ecloud rotation diameter (heat dependent vibration phenomena of state, changes with temperature). For this Li (Z#3) construction (F, $(-3,0)$) will be (π) end point of rotation diameter. I use parametric geometry to record Q's disruptive vibratory/oscillation intensity of temperature on collective sample to achieve change of state phenomena. I use five co-linear happening of the **CSDA** *internal latent heat thermometer* to register/coordinate transition.

- Vibration asymptote: (n) this asymptote gauges nuclear (latent heat) vibration of an element. Vibration is used to meter nuclear changes in temperature, cold and hot. Temperature causes internal vibratory motion of a **CSDA** (single) atom, not physical motion of a vector found in a Gfield system, where kinetic motion is comprised of curved space direction and velocity. As a *group* member, a single atom is relative in the sense of chaos of a system composition, contributor in part to collision temperature of gas or vibratory sensed temperate activity of a liquid or solid.

Two lines, vibration asymptote (n) and latent heat sensory thermometer (LT), have an interesting Cartesian **CSDA** intersection point (C). When parametric descriptive geometry of a standard model atom construction acquires this Cartesian intersection at (C):

$$\left\{\frac{Z\#}{(Z\#-1)}, \frac{Z\#^2}{(Z\#-1)}\right\}$$

the atom is at required (Q, heat) vibration for transition waiting only for group *resonance* to reach flash-over conversion of group into state, be it solid, liquid, or gas. Absorption or release of Latent heat energy, brings the entire population sample vibration frequency, into group resonance for transition. Then and only then, with group resonance completeness, can change of state occur. Once achieved, all members of the population will have identical spin vibration of group signature; solid, liquid, or gas. A condition I call State Relative excluding plasma (page 12).

This next construction is a **CSDA** GeoGebra map of latent heat thermometer and Hydrogen (Z# 1, ^1H).

hydrogen&heat.ggb

checking ID's.nb

2018

Change of state construction for ^{1}H; Z#1.

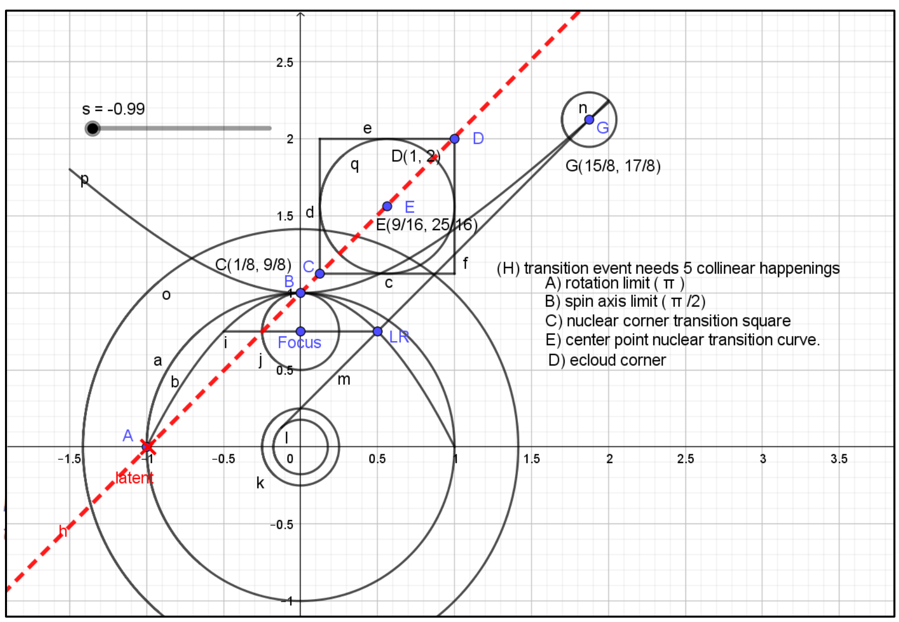
Proposed map for latent temperature thermometer recording of (Z#1;^{1}H)

Z#	(p): $\left(\frac{Z\#}{4}\right)$	Spin (B)	Ncorner (C)	Intec vibasymptote and latent thermom.	Trans curve center (E)	Ecloud corner (D)	Bond r	Nuclear binding r curve (I)
1 (H)	(1/4)	(0,1)	$\left(\frac{1}{8},\frac{9}{8}\right)$	(NA), in lieu we use ecloud rotation limit (A)	$\left(\frac{9}{16},\frac{25}{16}\right)$	(1,2)	$\left(\frac{15}{8},\frac{17}{8}\right)$	$\frac{\sqrt{2}}{8}$

Table 1: CSDA standard model data for H; Z# 1

A vibration curve cannot be constructed for ^{1}H. Shaping hyperbola: $\left(\sqrt{(Z\#)^2+(t)^2}\right)$ and vibration hyperbola: $\left(Z\#\sqrt{1+(t)^2}\right)$ to meter ^{1}H transition happening are the same curve!

(^{1}H, Z#1) cannot produce a vibration curve or its asymptote but can construct a transition curve and transition square to consummate change of state. The following construction finds intercept point(s) of latent heat thermometer with nuclear transition square. When latent heat thermometer (LT), touches rotation diameter of ^{1}H @ (-1, 0) in construction, it also passes through spin axis radius π/2, and the latent heat thermometer produced becomes <u>diagonal</u> of a transition square in nuclear space to meter required latent heat parameters for phase transition (five co-linear happenings).

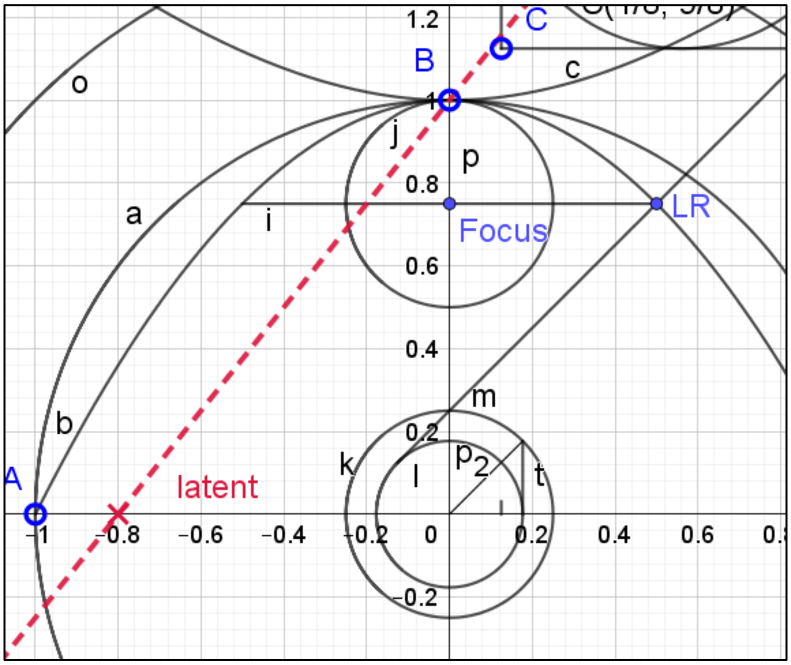


- Phase transition squares have two specific corners to make dynamic a latent thermometer congruence with transition square diagonal; ecloud (upper right corner) and nuclear corner (lower left); two happenings.
- When latent heat asymptote reaches rotation diameter limits of ^{1}H Z#1 (one happening), the thermometer also connects ecloud spin (one more happening).
- The fifth and final happening is a linear intersection of the latent thermometer with center of transition square $\left(\frac{9}{16},\frac{25}{16}\right)$ and enclosed transition curve:

$$\left(\frac{7}{16} * \cos(t) + \frac{9}{16}, \frac{7}{16} * \sin(t) + 25/16\right)$$

Means to find nuclear corner (C) of primitive ^{1}H.

1. Let (p) be initial focal radius neighborhood (j). Then, shaping curve (k) of nucleus will be focal radius (p).
2. If we let a nuclear radius (p) be aligned with nuclear squaring asymptote, we have a right triangle having hypotenuse = (p_2), and $2t^2 = (p_2)^2$, where (p_2) = ¼. solve $\left(2t^2 = \left(\frac{1}{4}\right)^2, t\right)\ t = \frac{\sqrt{2}}{8}$, binding energy radius.



repeat same exercise for abscissa and ordinate of binding energy radius $\frac{\sqrt{2}}{8}$ alignment with squaring asymptote within nuclear binding energy curve to find abscissa of nuclear transition square.

solve $\left(2t^2 = \left(\frac{\sqrt{2}}{8}\right)^2, t\right) = t = \frac{1}{8}$

ordinate will be $(Z\# + abscissa)$ = (8/8 + 1/8) = 9/8.

QED Presentation 2018; ALΣXANDΣR; CEO SAND BOX GEOMETRY LLC oxygen phase transition.ggb

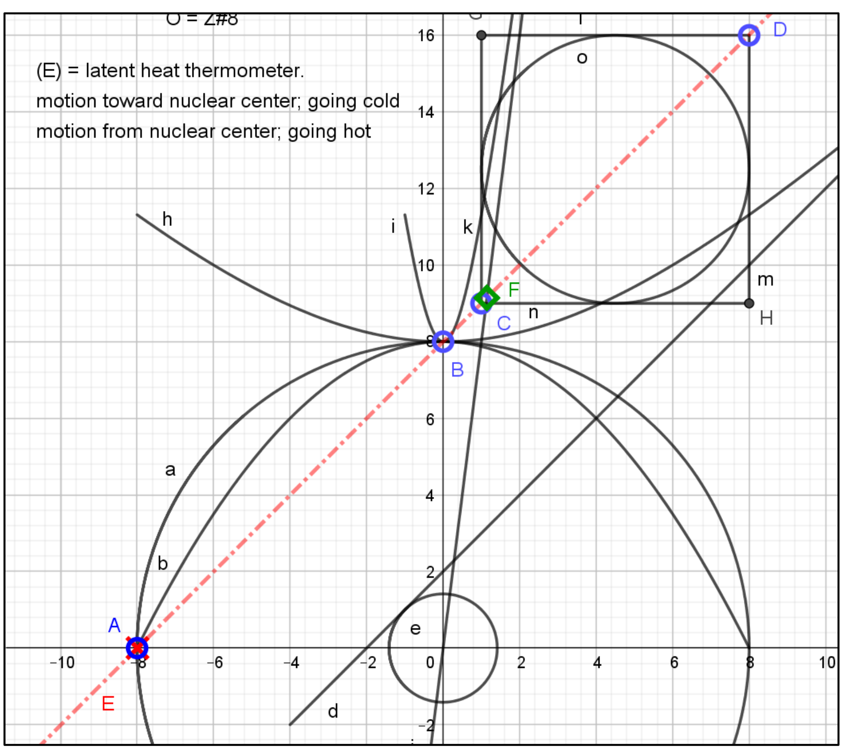
Oxygen Z#8

Table 2: Z# parameterize to construct O.

Z#	(p)	spin	ncorner	Intec vibasy and latent	Trans c	ecloud	Bond r	Nuclear binding r	Dec.
8 (O)	(2)	(0,8)	(1,9)	$\left(\frac{8}{7}, \frac{64}{7}\right)$	$\left(\frac{9}{2}, \frac{25}{2}\right)$	(8,16)	(15,17)	$\frac{1\sqrt{2}}{1}$	1.414

Oxygen. My reason for constructing O is demonstration of Z# thermal vibration intercept with latent heat thermometer. (C) is O nuclear corner and (F) is intercept of vibration and temperature.

If binding parabola (p = 2units), then the shape of a nuclear binding curve (e) will be (p $*$ (primitive of compression curvature which is $\left(\frac{1}{\sqrt{2}}\right)$). When integer (p) can be made numerically congruent with radicand, we clear radicals out of denominator and end up with the shape of binding curve energy (e); $\left(2 * \frac{1}{\sqrt{2}} = \frac{2}{\sqrt{2}} * \frac{\sqrt{2}}{\sqrt{2}} = \sqrt{2}\right)$. The shape of the binding energy curve (e) for (O, Z#=8) is: $\{\sqrt{2}\text{Cos}[t] + 0, \sqrt{2}\text{Sin}[t] + 0\}$.



Nuclear corner abscissa: $\left(2t^2 = \sqrt{2}^2;\ 2t^2 = 2;\ and\ t = 1.\right)$ Nuclear corner parameters: (1, 9). Slope (m) of dynamic thermometer =1. Let the latent thermometer be a geometry function of thermal vibration with respect to nuclear center. I say; when slope of thermometer is (m = ±1), where parametric description of thermal vibration curve asymptote is: (t, 8t), geometry slope sets parametric variable (t) @ Z#8 giving phase transitioning intercept happening @

$$\left\{\frac{Z\#}{(Z\#-1)},\frac{Z\#^2}{(Z\#-1)}\right\}$$

I have not constructed the latus rectum chord of Z#8 model. The center of the chord will hold the curves focus at $(0, 6)$, and the chord itself will intercept the parabola curve at a slope (m = -1) tangent. I reference this tangent as a unity tangent and will need construction of the tangent normal as we explore change of state in the first ten elements.

I use the parabola to unify field geometry. Every atom has a self-gravity hook. Consider huge light year expanses of interstellar dust clouds (Horse Head Nebula, a truly spectacular photo) of various image collecting satellites in orbit about earth i.e. NASA's Hubble. The external $\{t,\frac{t^2}{-32}+8\}$ unit parabola crosses rotation plane at 16 units of space to hook like atom elements to form the element chemistry collective.

Chemical collectives will occur in three states. Gas elements of the first ten have very low temperature for gas and liquid. I have rounded off degree Kelvin to collect data. These temperatures near absolute zero are very COLD.

The first two elements are principal composition of interstellar space. (He) is solid at very, very low temp. Being heavier than (H) we would expect less energy for keeping H solid but this is not the case. Also, check extreme temp fo (C) to become liquid and gas.

Element	Melting point	Boiling point	
H (Z#1)	14° Kelvin	20° Kelvin	
He (Z#2)	1° Kelvin	4° Kelvin	
N (Z#7) nitrogen	63° Kelvin	77° Kelvin	
O (Z#8)	54° Kelvin	90° Kelvin	
F (Z#9) fluorine	53° Kelvin	85° Kelvin	
Ne (Z#10)	25° Kelvin	27° Kelvin	

The remaining four elements are solids and have familiar extremely HOT temperature range. I list the triple point of carbon because it appears with so many compounds, from graphite to diamonds, thus so many temp/pressure relatives occur with carbon. Triple point is amazing. We can find all three states at the same time, temperature, and pressure; solid, liquid, and gas!

Element	Melting point	Boiling point
Li (Z#3) lithium	454° Kelvin	1603° Kelvin
Be (Z#4) beryllium	1560° Kelvin	2742° Kelvin
B (Z#5) boron	2349° Kelvin	4200° Kelvin
C (Z#6) carbon	Triple point 4600°	Triple point 4600°

I can now begin a standard model study of phase/state change for the first 10 elements. I make my proposals using three sections, and one simplistic plane geometry definition about phase.

1. Bonding Column: electromagnetic spin configuration of two atoms in a N↔S conjointment.
2. Proposed electromagnetic circuit flow between bond of two atoms.
3. Phase/state temperature induced alterations.

Parametric Plane Geometry definition of phase/state.

- Solid: an assembly consisting of minimum of three atoms at lowest temperature limit of population collective experience.
- Liquid: an assembly consisting of minimum of two and no more than two conjoined atoms as population collective.
- Gas: a population consisting of one and only one atom.

Principal architect of phase change on a fixed population of atoms in a closed zone is heat. I refer to heat as degree of chaos instead of degree temperature.

PLASMA: https://www.britannica.com/science/plasma-state-of-matter
A plasma may be produced in the laboratory by heating a gas to an extremely high temperature, which causes such vigorous collisions between its atoms and molecules that electrons are *ripped* free (Q disassociation) of an element, yielding the requisite electrons and ions. A similar process occurs inside stars. In space the dominant plasma formation process is photoionization,

https://en.wikipedia.org/wiki/Photoionization

wherein photons from sunlight or starlight are absorbed by an existing gas, causing electrons to be emitted. Since the Sun and stars shine continuously, virtually all the matter becomes ionized in such cases, and the plasma is said to be fully ionized. This need not be the case, however, for a plasma may be only partially ionized. A completely ionized hydrogen plasma, consisting solely of electrons and protons (hydrogen nuclei), is the most elementary plasma