16 Early nucleosynthesis in a pre-stellar environment

16.1 Collision and bonding

The initial evolution of atomic nuclei may have its origin way back within an embryonic universe, not long after what has in this model, been called the big-ping. The early synthesis of primordial hydrogen and the proton-to-proton collisions that ensued would have caused an episode of heating within this environment that sparked the first processes of nucleosynthesis long before the earliest hydrogen rich stars had formed. This temperature increase would be short lived however, because of the effects of four-dimensional expansion, but there would be time for a proportional amount of the lighter elements to synthesize, like deuterium, helium, lithium and perhaps even beryllium.

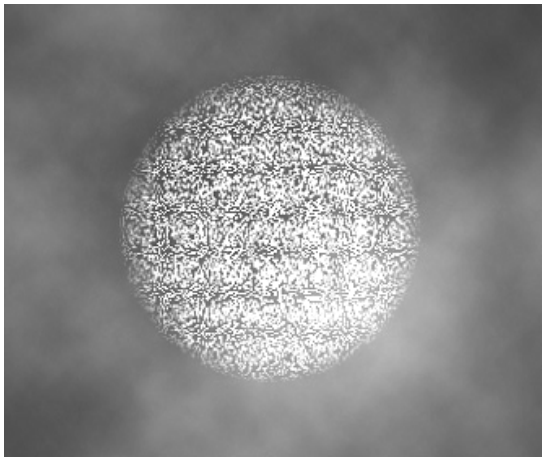

Figure 16.1.01 *The big-ping would deposit a great deal of 3D material into a relatively small volume of 4D space. This would also include a great deal of momentum inherited from the big-snap way up in the eighth dimension. Collisions would create heat within this expansive environment.*

As expansion progressed and this early environment became more rarefied as a consequence, cooling would end this first episode of nucleo-synthesis as both density and temperature dropped. The result would be the ratio of these lighter elements to hydrogen that we may infer from the observational evidence today. The environmental conditions would be crucial to the bonding process, as collisions between primordial hydrogen nuclei became more frequent as a consequence. The input of kinetic energy into the system would temporarily, but fundamentally alter the characteristics of the proton's rotational groups - 'flipping' the resultant charge component that each of these produced (see again Chapter 14). This conversion would produce a simple, *attractive* configuration between approaching or colliding nuclei; concentrated at the smaller 'S' face rotational groups of the proton. This would allow for a *predictable* method of bonding during these episodes of ***flipped polarity*** and provide the mechanism and the impetus for the evolution of those early three-dimensional elements - that Mendeleev would later collect together to form his periodic table.

These processes would occur primarily because of the fundamental interactions between the 'wave' components that form an indispensable part of the proton's character. This *dimensional boundary surface wave* phenomenon would result from the initial face-spin bias of the whole surviving teddy (see again Chapter Six) and would thus provide the component of 'communication' between interacting nuclei. It is the interplay between these 'protonic' *dim-waves* that in this model, are all important to the evolution of the three and four dimensional world of which we have become an integral part.

As environmental parameters changed however and four dimensional expansion made itself felt, the initial densities and temperatures of the embryonic universe would change and these more rarefied surroundings into which this 3D material now found itself suspended, would bring to an end both the frequent proton-proton collisions and therefore, this particular input of energy into these systems, (that had previously been required to fuel the 'flip' in rotational group polarity). In other words, this brief, initial episode of element building would have to cease. The universe would

not see a similar phenomenon until the growing influence of clumping (brought about by the onset of gravity), produced the first proto-stars proper; perhaps some hundred million years or so into the future - after the universe has expanded considerably.

Chapter 14 closed with a brief discussion about the possible effects of pressure and temperature on the bonding characteristics of the proton within the young embryonic universe; which would not be long after what has been termed the big-ping in this model. Hydrogen, the 'fuel' for such violent processes, would have already evolved independently (see again Chapter 13). The big-ping marks a *differentiation* of dimensional energy and a drop of what would become our three-dimensional material into a surrounding, expansive 4D environment (also coinciding with a drop of contractive 5D material further up the dimensional ladder). Although expansion would logically have to take effect immediately, this appearance of 3D material would have inherited a great deal of momentum from the big-snap, where whole surviving teddies and independent dimensional boundary chords alike, would be endowed with a great deal of kinetic energy. This would all occur in a relatively small volume of four-dimensional space and collisions between these new 3D particles would be commonplace.

Although expansion would be a positive component of this environment, an initial stage of *heating* would ensue within this embryonic cosmos. There would be a *rapid* temperature rise, even if it were only a relatively short-lived one. It would be during this episode that the early universe would experience the first of its proton-proton coupling events. These would result from an increase in the resonance of the teddy's boundary chords due to frequent and violent collisions and herald a 'flip' in the relative polarity of its paired rotational groups or faces (see *Figure 16.1.02* in the next column).

This input of energy would increase the frequency of this resonance right across the board so to speak, which in turn would be the cause of the *polarity flip* experienced by each rotational pair. It was touched upon in Chapter 10 and discussed in a little more detail within Chapter 12 that it may be possible for the faces of the proton and their 2D membranes to be regarded as ***spinorial objects***. Such an increase in rotational speed (and thus a rise in the frequency of

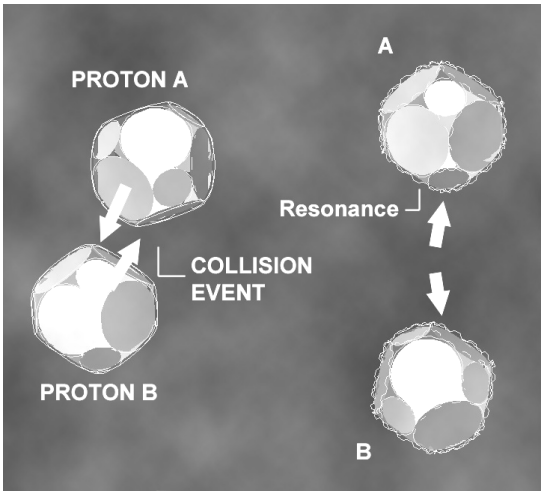

Figure 16.2.02 *As collisions occur within the young, energetic embryonic universe, protons will absorb kinetic energy and the frequency of their boundary chords' natural resonance will increase as a consequence during rebound.*

resonance), would be caused by this input of kinetic energy and this could change the polarity of these objects from positive to negative and visa-versa. This would have a very interesting consequence on the overall configuration of these faces and would therefore affect the influence of any interaction between any two approaching teddies. It was also suggested in Chapter 14, that it might also be possible to further illustrate this phenomenon with the use of *Fourier analysis*. Not only would this approach provide a means of dealing with the 'component' nature found within the individual faces (their *boundary chord value* - or the number of boundary chords that make up a particular face), but this ***component of periodicity*** as it could be termed, also corresponds to the concept of *pure tones* within a wave function. Each rotational group (either 'S' or 'H' faced) is

comprised of a pair of circular boundary chords and it was thus further suggested that this could naturally define each of these faces as a *Laurent Series* in terms of their behaviour.

Each 'S' and 'H' face is comprised of a different number of boundary chord values (four for 'S' and six for 'H') and each type can therefore be described thus:

$$S = \frac{l}{(4)n} \qquad H = \frac{l}{(6)n}$$

where *'l'* represents the periodicity of the face's resonance as a whole and *'n'* describes the *boundary chord value* of the face, which in turn corresponds to the *pure tones* that comprise each of the circular chords' overall *component of periodicity*. These components were illustrated in Chapter 14 as *Figure 14.2.01* (see again page 116).

The geometry of the teddy will naturally allow for this *pairing-up* of faces to produce symmetric rotational groups and, with the inclusion of face-spin bias - will also allow each of these groups ***rotational conformity***. In other words, both members of a group will exhibit the *SAME* direction of axial rotational (or spin-up and spin-down). It will be this phenomenon that produces each of the teddy's rotational groups in the first place.

The symmetry of the teddy (now a proton or neutron, depending on whether or not its energy threshold has been crossed); *could* be described as being perfectly spherical (see again Chapter 15). Looking at a *single* rotational group for the time being, this (currently) *abstract* object will be comprised of two components - each of which will be responsible for a single component of polarity under certain conditions. In the proton's *ground state*, the 'H' face rotational groups will be producing this *2-state* component and each of these 'H' face pairs will therefore comprise a 'north' and a 'south' pole. This bi-polar group will in effect, have an emitter and a receptor. In contrast, the 'S' face rotational groups while in their ground state - are producing a lower dimensional energy signature (because of the lower frictional component caused by their 2D membrane rotation); which is as a consequence, purely expansional in nature. These 'S' face groups are therefore 'mono-polar' (or indeed monopoles) where each component will be either north - or south, but not at the same time. This was illustrated in a little more detail within an earlier chapter of this series and it is these characteristics of polarity *within* these two different rotational groups - that determines the apparent *charge* displayed by the proton under usual (ground-state) conditions (see Chapter 10).

Each dimensional boundary chord value (the period's *pure-tones* in this respect) has its own *area of influence* - any two of which add up to the 2D membrane area of any particular face. This membrane is rotating however, as the angular momentum (the face-spin bias) is transferred from the dimensional boundary chords to these membranes because of *spin-conflict* (also dealt with earlier) and just like the rotating brushes within the coils of a dynamo, the resultant dim-waves can be considered as possessing charge. This almost friction-like disturbance between two-dimensional membranes and three-dimensional boundary chords - will be of *TWO* distinct magnitudes that in turn, are dependent on the relative sizes of these face components and the force that they exert. Angular momentum will play a significant role here, as the original face-spin bias was confined solely to the hexagonal faces of the whole surviving teddy. *Spin-conflict* transfers the remaining proportion of this momentum to the newly formed smaller 'S' faces and, because of the conservation laws, this transferred rotational energy must speed-up because of the smaller 'S' face radius; (just like that well-worn analogy about the figure skater who will spin around on the spot faster and faster, the closer she pulls her arms in towards her body). The teddy's 'S' faces will therefore; end up with a faster rotational speed at their circumference (where their boundary chords are located) than that of the neighbouring 'H' faces. This difference in rotational speed (quoted as 2π for 'H' and 3.5π for 'S' for the exercise within Chapter 10); is responsible for the polarity of the

faces - and this in turn will have a direct relationship to ***face resonance***. If the natural rotation of the 2D membranes create dimensional boundary chord resonance as a result of the original face-spin bias; then an increase in the frequency of resonance due to an input of kinetic energy, may cause a comparable increase in rotation. As these surfaces can now seem to be considered as *spinorial objects* in their own right, then the consequences of this increase may be far reaching.

16.2 More on the 'polarity-flip'

If this increase in resonance was of a magnitude that allowed the 'H' face to 'flip' its polarity to the negative, the minimum rotational increase would have to be from 2π to the 3.5π value currently allotted to the 'S' face. This should in turn, also relate to an 'S' face rotational increase that should be proportional. As this 'H' face increase amounts to ***1.74x*** then if the 'S' face followed suit, this would bring its value up *to 3.5 x 1.74 or 6.1*π. In this model, this increase in rotation speed should be sufficient enough to result in a ***polarity flip*** that would affect both types of face. Both faces would therefore cross their energy threshold (or natural ground-state) and would also emit dimensional boundary surface wave energy as a result. This would eventually radiate this kinetic energy into the appropriate boundary - which means that this 'flip' is of a temporary nature. The boundary chords and 2D membranes would eventually return to their ground state with a rotation speed equivalent to (or close to) the original 2π and 3.5π values quoted for this exercise.

This extra kinetic energy could only have what could be called a *primary* and a *secondary* source. The primary source of energy would be collision and, in such a relatively confined space as would be found in this young, embryonic universe (of only a handful light years across in this model); such events, coupled with a high momentum carried over from the big-snap, would no doubt be commonplace. The secondary source of energy would be from previous collisions and the consequential emission of dim-waves that such earlier encounters would have produced. This would take the form of heat and the initial, but temporary massive increase in temperature that would have been experienced by the universe as a whole.

The *polarity flip* would change the rules so to speak and the interaction of proton to proton especially, would also be turned on its head. By this time, perhaps quite a large proportion of the original whole surviving teddies may have evolved into atomic hydrogen (see Chapter 13); but logically speaking, there must certainly still have been a fairly good percentage of 'naked' *Stage 2* reconfigured protons. In this model and of course in the real world, the proton is electrically active and carries its +1 charge. In this model though, this charge is the responsibility of the proton's seven rotational groups and the 2D membranes within and *NOT* the *quarks* of conventional physics.

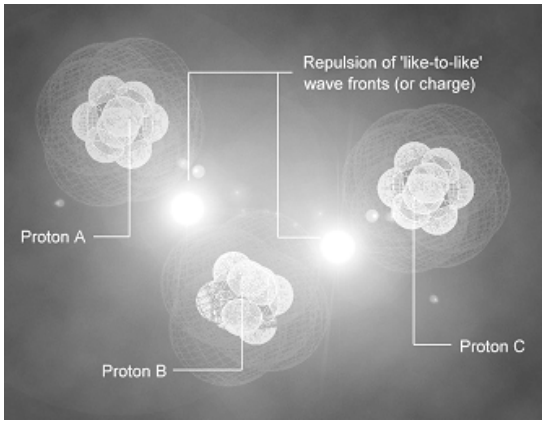

Figure 16.2.01 *The repulsive effect of 'naked' proton to 'naked' proton would make bonding difficult, even with the over-riding influence of collision because of big-snap momentum.*

It is the nature of the universe that it cannot seem to abide 'like-to-like' charge (or polarity) and there is thus a natural repulsive effect between closely packed protons in this configuration (see *Figure 16.2.01* above). There would however, still be enough momentum to *temporarily*

overcome this repulsion, so collisions would still occur and heat would still be generated. In this present state though, it is difficult to see how such bodies could remain in close proximity for *long enough* to allow coupling or bonding to take place, as repulsion would eventually win out in the end. This scenario however, *does not* need to occur within this model once heat and/or collision becomes part of the equation, because of the 'built-in' mechanism that will allow this *polarity flip* to take place.

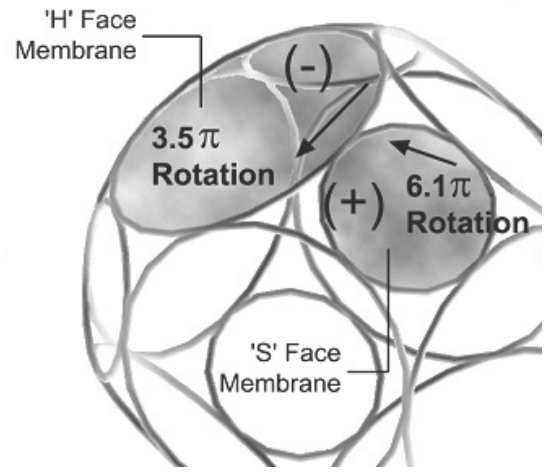

Figure 16.2.02 *With an appropriate input of kinetic energy, the angular velocity of rotation of each type of membrane may increase to the extent that the rotational groups 'flip' polarity and increase their apparent charge.*

By allowing both types of membranes to speed up their rotation because of kinetic energy, one is not only changing around the sign of this effect because of the *spinorial* implications described above - but also the ratio that originally exists between them. To produce what amounts to a 6π + rotation of the 'S' face membrane (which in this case would change its value from the negative back to positive), this has actually *cubed* the effect of the original face-spin bias of the 'H' face back at the dimensional boundary chord (its rotational component would have been *changed* three times) and this would as a consequence, produce 8x the charge. Not quite doubling the rotation at the 'H' face membrane to circa 3.5π will *square* the charge at its boundary chord and hence produce *double* the charge (rotational speed has changed two times). Although the change in rotational speed of the 'S' face membrane (now also applied to the higher energy 'H' face version because of collision); is not quite a multiple of 2π the effects are. This will act rather like the quantum itself - that can only seem to come in 'packets' that relate to a whole number. This may sound a little like cheating a bit to make things work, but these effects are actually quite subtle when looked at closely.

In his book *"The Road To Reality"*, Roger Penrose provides what is a quite brilliant illustration and analogy as to just how these spinors can work (and anything that Roger Penrose says is law as far as I'm concerned); with props or apparatus as simple as a single trouser belt and a collection of books[1] and because the calculated 3.5π quoted above is actually closer to 4π than to the original 2π, its effect is to take on the characteristics of the former. In this respect, there seems therefore, to be what could be called a ***zone of tolerance*** either side of a complete 2π rotation; (try it).

As has already been speculated earlier in this submission (Chapter 14), the cubing and squaring of the original face-spin bias component can be related to the given coulomb value of both types of charge component and these can provide the following observations. Note that during this 'flipped' state, the charge characteristic of the 'H' component changes from (↑) to (↓), while that of the 'S' component is visa-versa:

$$\textit{'H' pair component} (\downarrow) = 2x\ (-5.340 \times 10^{-19}\ C)$$

$$= -1.068 \times 10^{-18}\ C \times 4 = \mathbf{-4.272 \times 10^{-18}\ C}$$

and

$$\textit{'S' pair component} (\uparrow) = 8x\ (+1.780 \times 10^{-19}\ C)$$

$$= +1.424 \times 10^{-18}\ C \times 3 = \mathbf{+4.272 \times 10^{-18}\ C}$$

This would seem to imply an element of *neutrality* as far as the overall charge of such a

'flipped' proton is concerned. This is good, in the sense that this would also appear to take away the component of repulsion from such an equation - and this opens the door to the possibility of close, unhindered contact - which in turn, may allow coupling. The other important aspect of such an event is the fact that it is now the 'S' face membranes that are producing a positive and therefore *bi-polar* emission. Just like any bar magnet, this will allow opposites to attract, while like-to-like is still a no, no. Even though only of a temporary nature (as this input is via dimensional boundary surface wave action), this may create an environment where closely packed 'flipped' protons begin to attract each other - until they eventually 'flip-back' to normal.

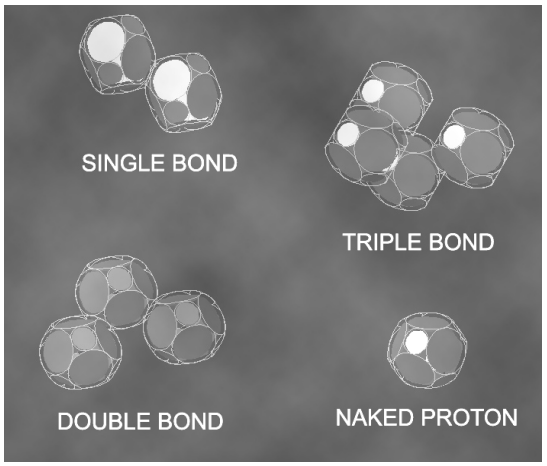

Figure 16.2.03 *With a total of three polar axes, a 'flipped' proton could be expected to have the chance of bonding with a total of three other protons, but evidence and observation does not bare this out.*

Returning to our *'flipped-polarity'* protons, each 'S' face rotational group will now display a *north* and a *south* pole (previously the prerogative of the 'H' face) - and in such a crowded environment, they may begin to act like tiny magnets, attracting the opposite pole of *another* neighbouring proton. Each 'flipped' proton will however, display a total of *THREE* north and *THREE* south poles, because there are of course, a total of three 'S' face rotational groups. This also means that such encounters may not be confined to just a single north-south coupling - as each 'flipped' proton would theoretically have the capacity to bond in this way with *three* other protons.

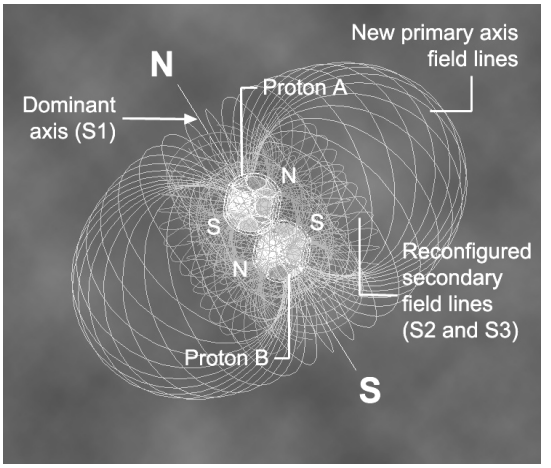

Figure 16.2.04 *As two 'flipped' protons bond, the field lines are reconfigured and the pair acquire a single dominant axis; while the secondary S2 and S3 axes re-route because of a closer proximity to the nearest opposite pole.*

In any given volume of space during this early period in the universe's history, one might have expected to discover what may have amounted to an equal number of single, double, triple and quadruple bodies as chance began to show its hand. Had this been the only influencing factor, one might expect to have found perhaps an equal number of hydrogen, deuterium, helium-3 and helium-4 nuclei dotted throughout the present universe - but as this is clearly not the case - some other process or processes must have made their presence felt (see *Figure 16.2.03* in the previous column). As the north or south pole of a 'flipped' proton attracted the north or south pole of another, these would couple in a more or less random manner between any two of the three 'S' face axes located on each proton. This would achieve an S1 to S1; or S1 to S2; or S3 to S2 - or any other of the possible (opposite) combinations available. This action would produce two joined protons that now shared a common or ***dominant axis*** with a *polar* orientation that was now north-

south-north south (or visa versa of course). The newly bonded pair of protons will lose the north and south pole at their junction and the fields of both will reconfigure to form one larger, *SINGLE* field (see *Figure 16.2.04* in the previous column).

We can now return to the 'chicken and egg' question asked earlier, because it now seems even more probable that there could be even more of a chance that the alignment of the poles north to south, is due to the fact that the rotation of the membranes (or their face-spin bias) will prevent bonding if there is a spin-conflict. This will only occur if like-to-like poles come into contact with each other and as mentioned above, coincidentally or not; it is the *opposite* poles that provide a rotational direction that is *complimentary* in the sense that two bonding faces will *both* exhibit the same spin direction.

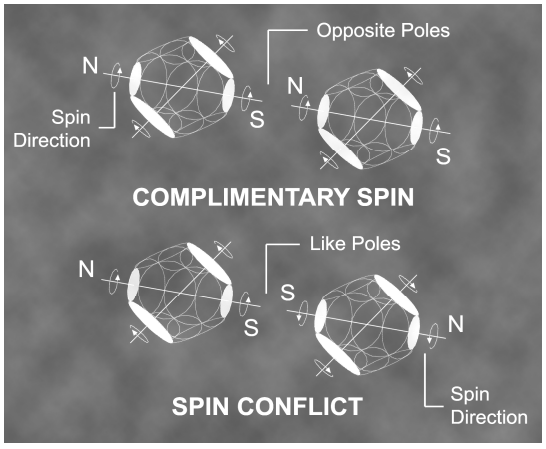

Figure 16.2.05 *Protons may only bond when their contacting faces have complimentary spins and this is always between opposite poles. Spin conflict or membrane rotation in opposite directions will repel.*

This is therefore, definitely another one of those instances where it is not yet clear whether the lack of spin conflict is the reason why opposite poles attract in the first place and like poles repel, or whether it is to do with the fields themselves. It seems likely however, that complimentary spin *IS* the mechanism that allows or at least assists in the proton to proton face-to-face bonding process (see *Figure 16.2.05* above). This action of north to south bonding will also extend the polar distance (the distance between the poles) and this can be considered as being inversely proportional to the square of the field strength itself. With two protons thus connected together, the polar distance has actually doubled - so the field strength will end up being just a quarter of the original. This first bond will be described as an **S1** bond as no matter what the orientation, it will produce a single *primary* or *dominant* axis that passes through both protons. There will still be two secondary axes (the S2 and the S3) and these will reconfigure too.

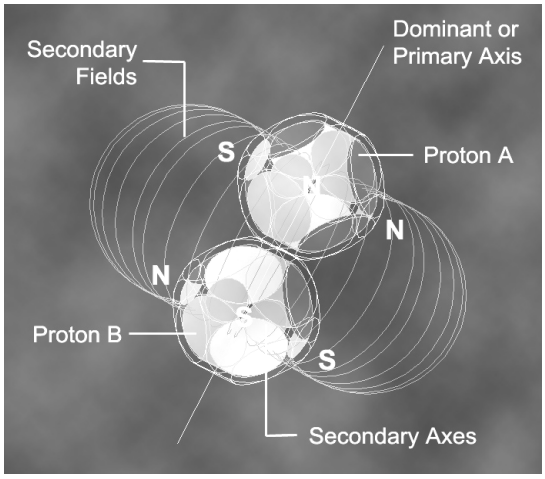

Figure 16.2.06 *As two 'flipped' protons bond, their secondary fields combine because of their close proximity to each other.*

These secondary axes with their own associated fields will need to reconfigure to take into account the poles of both protons as this bond begins to take effect. A new combined field is produced between what are now adjacent north and south polar faces of two different protons (see *Figure 16.2.06* above). These combined fields will now actually behave as if they were a two-component one (the **S2** and **S3**) and will connect the secondary axes of both bonded protons. There are *TWO* secondary axes (on each proton) and their polar orientation can only result in the NNSS or SSNN shown in the figure above. Therefore, one hemisphere of the field will be of the opposite polarity to the other, but each axis

will still possess what amounts to both an emitter and a receptor - so the field can be said to be in equilibrium. With all *three* polar axes being utilised, what this does produce however, is a body with two fields; one inside the other - but because of the inverse square rule mentioned above, the outer (or S1) will be considerably *weaker* than the S2 and S3 fields within. The dominant (attractive) force of this first bond will now become centred on these combined inner S2 and S3 fields (see *Figure 16.2.07* below).

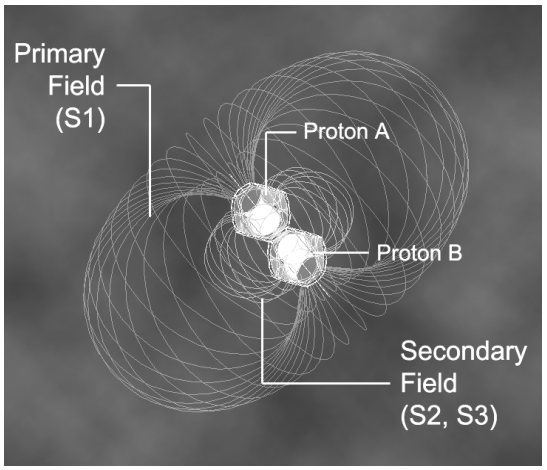

Figure 16.2.07 *The combined secondary fields (S2 and S3), will become the dominant attractive force of this first, single bond. The primary field will just be a quarter the strength of the original.*

Should this new bonded nucleus 'flip' back to its lower energy state with its originally positive 'H' faces and negative 'S' faces *without* any further collision events, it would become a *deuterium nuclei* and the next stage of its evolution within this model should be briefly outlined. This body is emitting *dimensional boundary surface waves* of a higher energy level because of an input of kinetic energy that has basically necessitated an increase in the angular velocity of rotation of its 2D membranes. This energy (in the shape of its S1, S2 and S3 fields) is actually dissipating into space and is thus attenuating. As this energy drops back down to below the natural threshold of the teddy, the angular velocity of the membranes will drop to normal and each of the coupled protons will take up its previous configuration. Due to what may be the zone of tolerance argued for on page 139, each of these protons may 'flip' their polarity back to their *positive* 'H' and *negative* 'S' face origin some time after its diminishing energy level again reaches its (previous) ground-state. This new configuration with two newly bonded protons may therefore have an energy threshold that is now significantly lower than that of just a single teddy. This may be as a consequence of the bond area itself and also what is known as the ***mass defect*** of this new double nucleus.

16.3 The mass defect

As the mass of a multi-nucleon nucleus is always *less* than its constituent parts, there is therefore, an obvious mass loss within the system (this *mass defect*) during such bonding processes. A lower overall (proton) mass would in this model at least, seem to infer a lower energy threshold and perhaps a consequentially *slower* rate of rotation for its 2D membranes (or their rotational groups). Through experiment and observation over the years, this mass loss would (conventionally) appear to have a direct relationship with the emission of *gamma rays* during this process and thus, there would seem to incur a conversion of mass to energy (assumed to be equivalent to the *mass defect* itself).

In the case of deuterium, *its* mass defect will of course be the difference between its *new* atomic weight and that of its constituent proton and neutron (the mass of the electron usually being ignored in most circumstances). Contrary to convention, the unit of mass used throughout this model, is the more familiar *kilogram* (not the *unified mass unit* 'u') and for deuterium, this *mass defect* amounts to *circa* 4.0×10^{-30} *kg*. This mass loss will also have a direct relationship with the *single bond* that will exist between deuterium's single proton and single neutron and in this particular model, this should be illustrative of what is actually happening in the vicinity of this surface. If a relationship can be determined between the mass defect of specific nuclei *AND*

the number of 'S' face to 'S' face bonds called for in this model, then this may present a clue as to just how this bonding process affects the boundary chords of each teddy in any particular nucleus. Therefore a brief comparison has been made between the mass defect of some of these early elements (and 'pp1' chain isotopes) up to and including neon (all values in kilograms) - and what will be the *predicted* number of 'S' to 'S' face bonds that these nuclei would include within the boundary chord model. This comparison has been presented as *Figure 16.3.01* below.

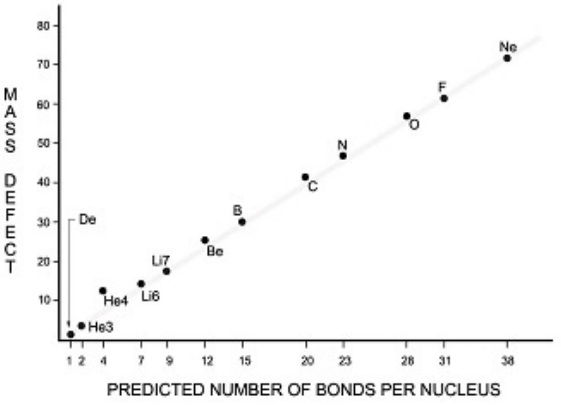

Figure 16.3.01 *A comparison between the mass defect of the early elements and isotopes and the predicted 'S' to 'S' face bonds of this model's nuclei.*

It should be noted that the 'y' axis in the figure denotes the mass defect in units that are equivalent to multiples of deuterium's *own* mass defect or 4.0×10^{-30} *kg = 1*. The resultant plot is also uncorrected as far as statistical scaling or 'least squares' functions are concerned. The faint grey line, simply represents a straight-line gradient through the origin to neon. Most plots fall pretty close to this straight line - with the exception of helium-4, which can certainly be considered as a 'flyer' in this respect. The graph seems to tally pretty well with the predicted numbers of 'S' to 'S' face bonds that would be expected from this model and the trans helium-4 elements especially, would seem to indicate a mass defect per 'S' to 'S' face bond in the region of 8.0×10^{-30} *kg*. This will be explored in much more detail at a later date.

The individual mass defects of these early elements and isotopes also provide the inference of a clue that could suggest a somewhat different sequence of synthesis when compared to the logical, initially accepted progression from

Element	*N+,*	*No*	*No of bonds*	*Mass defect (per bond)*
De	1,	1	1	4.0×10^{-30} kg
He-3	2,	1	2	7.1×10^{-30} kg
He-4	2,	2	4	1.3×10^{-29} kg
Li-6	3,	3	7	8.1×10^{-30} kg
Li-7	3,	4	9	1.1×10^{-29} kg
Be-8	4,	4	12	8.4×10^{-30} kg

Figure 16.3.02 *Table showing the relative mass defects of the early elements and isotopes per predicted bond number within this model.*

hydrogen to (say) beryllium. The (converted) overall mass defects per bond from H to Be (in kilograms) have been included as *Figure 16.3.02* above, which will be discussed in more detail later.

There would actually appear to be *TWO* flyers within this data (helium-4 and lithium-7) and this could infer a hidden clue that may be linked to the production of these elements within the very young embryonic cosmos. This would also be linked to early stages of expansion, where pressures and temperatures were much higher than they are today. This would go hand in hand with a much denser four-dimensional medium in which our own 3D material was suspended and where the very act of bonding (or very early nucleosynthesis) required substantially more energy than similar processes do today. This could therefore, indicate a two-stage sequence of events that may also help to explain why for example, there are no naturally occurring five or eight nucleon elements and why the 'pp1' chain these days, requires the loss of two protons from a pair of bonding helium-3's.

There may have been a time however, when a much denser environment (expansion wise), did not include the repulsion of these two protons during the collision and bonding of two helium-3 nuclei. As a consequence, this may have resulted in a two-stage sequence of early nucleosynthesis (see *Figure 16.3.03* below).

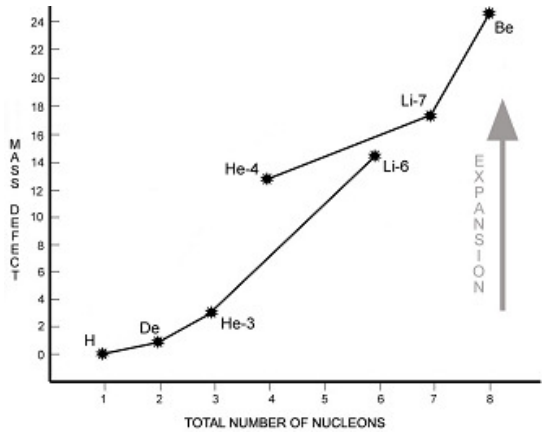

Figure 16.3.03 *A plot of mass defects against number of nucleons, which may infer a two-stage component in the synthesis of the early elements because of the 4D expansion of the embryonic universe.*

In the figure above, the mass defects shown are again based on deuterium *(4.0 x 10 $^{-30}$ kg = 1)* and the distinct two-component plot would provide the universe with lithium-6 from colliding he-3 nuclei - *prior* to the synthesis of he-4 (by way of two he-3 losing a proton each because of a more rarefied environment). There would be a time however when (because of continued expansion), this two-stage synthesis overlapped and the collision and bonding of two he-3 nuclei may have produced either he-4 or li-6. As expansion continued, helium-3 would now be free to bond with helium-4 (in perhaps small quantities) to produce lithium-7. Beryllium and the heavier nuclei would follow later.

Returning to deuterium, its single bond would seem to be responsible for a mass defect of around *4.0 x 10^{-30} kg*, but can *this* defect be qualified as far as this model is concerned - and *why* would this seem to be exactly *half* that of the trans helium-4 plots on the graph in *Figure 16.3.01* on the previous page? Firstly, a mass conversion to dimensional boundary surface wave energy would seem to be the logical choice for the origin of the mass defect during the bonding process and secondly - this would in turn *lower* the energy threshold significantly enough to alter what I have called the ***savory index*** of the rotational groups.

16.4 Deuterium

Although primarily brought about by the additional mass of the bond itself (double the boundary chord values at the bond face), the system is obviously more massive anyway and can absorb more energy. This also means that the mechanism that causes 2D membrane de-gassing has also been modified and this will only support a smaller proportion of de-gassing events within this new bonded system.

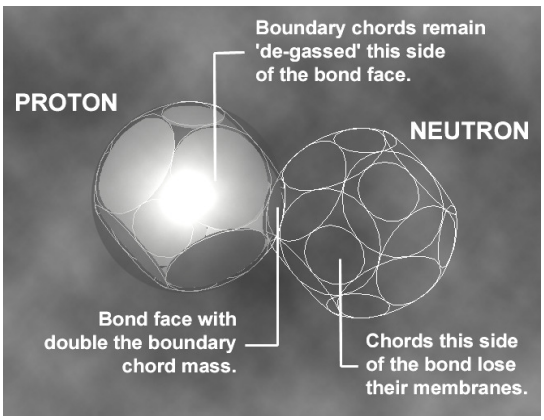

Figure 16.4.01 *As the bonded pair loses energy and reverse their polarity back to normal, the energy threshold has changed and half the 'de-gassed' membranes are lost. The system becomes a nucleus of deuterium.*

The bonded face will now also comprise *all* of the boundary chords from *both* these faces and these may intertwine. They would have to shrink as a consequence; as would the individual areas of influence - and this would mean that each *AOI* would now produce exactly *half* the value of

those from the other 'S' faces. As there are twice as many *AOIs* anyway, the final membrane area remains the same. This greater mass not only marks the division between the two protons that form the bond, but will also form a division between faces that *degas* and those that don't (see *Figure 16.4.01* on the previous page).

This forces one of the protons to revert to its *Stage 1* configuration; it loses its membranes and reverts to the neutrality and mass of the neutron. The bonded pair will thus become a system with one proton and one neutron - or a ***deuterium nucleus***. The *de-gassing* characteristic may also be assisted by the proximity of like-to-like charged faces, once the system reverses polarity once again when it 'flips' back to normal (see Chapter 14). The bond is now held in place by the *meshing* of the boundary chords at the bond face and their smaller, more numerous *areas of influence*. This bonded face also shares a single membrane with the same *3D mass equivalence* of any other. The 'H' and 'S' faces will resume their dim-wave emissions as before and this will prompt the formation of deuterium's *e-shell* in exactly the same way as that of hydrogen (briefly described in Chapter 13). Once again, there will exist a *mass deficit* because of the action of these 4D+ dim-waves and this will capture a *1e* electron mass that originates from the decomposition of the independent boundary chords during their own reconfiguration processes (see Chapter 11). This and some of the other processes that affect the atom's surrounding environment will need to be illustrated in much greater detail and the importance of the electron shell especially (or this model's version of it), will be reserved until the third Chapter in what will be *Volume 2* of this series. In order to keep a certain amount of continuity going however, the next of these chapters must continue the theme of this early 'pre-stellar' nucleosynthesis and will look a little closer at the next stages of element production within what is still a very early stage in the evolution of the embryonic universe.

As already hinted at, this may not have taken quite the same route as depicted in the conventional ‘pp1’ chain reaction - but may have instead, been more of a *two-stage* process. Chapter 17 will thus try to deal with the evolution of helium-3 and why it may have proceeded in two distinct directions. This would include phenomenon such as ***signature angular velocities of rotation*** (first mentioned briefly on the previous page) that in this model, may have assisted in the processes that would lead to helium-4, lithium and even beryllium in this early embryonic stage of element building.