11 Independent dimensional boundary chords

11.1 The origin of the IDBCs

The majority of this work has thus far, concentrated on what have been called the *'whole surviving teddies'* that would ultimately reconfigure within our own 3D/4D environment to become the proton and neutron. Whilst their 're-mapping' is perhaps the most noticeable aspect of the dimensional boundary chord model, it should not be forgotten too quickly, that the greatest proportion of three-dimensional mass that *pings* into what will become our part of the universe, will actually be made up of the ***independent dimensional boundary chords*** that were teddy volumes that *didn't* make it here in one piece. Together with the whole surviving teddies, (that would themselves, evolve into the familiar baryon family), these individual boundary chords would undergo their own process of evolutionary change. Entering a much more rarefied and lower density environment compared to the 8D lattice from whence they too came; they would undergo a fleeting episode of decompression during which time, they would surrender a minute proportion of their mass.

No longer held in check by the supporting lattice as it expanded under the influence of fourth dimensional scale, these boundary chords would perform a ***rebound*** as they snapped back to their original size. Releasing large amounts of potential energy, they would eventually become stable with a new mass and scale that would go on to play what would be one of the most equally important roles in the future evolutionary processes of this 3D/4D world that we ourselves, would later become an integral part of.

Their metamorphosis during those early events would completely change their character. In a very short space of time, they would be transformed from the independent dimensional boundary chords that were once an integral part of the 8D lattice - and would evolve into what would become one of the three major types of building block in our own three and four-dimensional part of the universe. Although almost instantaneous in our terms, this transformation would involve several distinct stages - each of which would determine the evolutionary path that these objects would ultimately take. Made from the same material as the whole surviving teddies (that would become the protons and neutrons), their character would be *different* for two fundamental reasons.

First of all, they were of course, independent or individual boundary chords that broke free from the 8D lattice as rod-like or *acicular* entities. Their number would be eight-times greater by mass than those chords, *locked-in* to the structure of the whole surviving teddies. They would therefore be the most numerous of all the new, three-dimensional objects entering our part of space. Secondly and unlike the boundary chords making up the whole surviving teddies, they would end up with *loose* or *free* ends and this would make a big difference to their subsequent evolution. This characteristic would allow them to literally shake themselves apart as it were - and this too, would result in far-reaching consequences for the three-dimensional universe as a whole.

As the 8D lattice broke up during what has been called the *big-snap* in this model, the boundary chords making up this structure had undergone a period of stretching that could not continue indefinitely. Eventually, this stretching resulted in the break-up of the lattice that would separate independent boundary chords and whole surviving teddies alike - which because of their *lower* energy signature - would drop to what we would later recognise as our own three-dimensional level; a universe that we currently see buoyed up and supported within the envelope of the expansive fourth. The break-up of this lattice *would not* be uniform however as whole surviving tetrakaidecahedra would make up just *one-ninth* the total of all resultant 3D material.

The majority of this condensate would break into individual or independent boundary chords. For every thirty-six boundary chords that were locked-in to a whole surviving teddy, there would be two hundred and eighty eight of these independent relatives. All of this material (that had previously condensed from the tri-planar coordinates in the 8D lattice), would drop dimensionally to become our world (and ultimately us). Not only would this period of extreme stretching initiate the big-snap, its appearance into what was to become *our* world, would also be coupled with a massive *rebound* in this chord material as both independent and locked-in boundary chords *shrank* back towards their original size (determined by the scale of the 8D lattice at the time of this tri-planar condensation).

11.2 Divergent reconfiguration

Compared to the stretched-out size of these boundary chords, this rebound back to their original length would be something like four orders of magnitude (*c.* 10^{-10} *cm* to *c.* 10^{-14} *cm*) and this would involve a considerable release of energy in the form of a *dimensional boundary surface wave* (see again Chapter Six).

As well as this energy release, such a massive rebound would also (in this model at least), produce a long-lived *resonance* within the body of the chord that would manifest itself as vibrational phenomena - not unlike the resonance we see in a stringed instrument (although these chords would have two loose or free ends). The first event to involve these independent boundary chords after their big-ping into our 3D universe, would involve the new environment itself.

In whole surviving teddies and independent dimensional boundary chords alike, there would occur a *de-gassing* of condensed membrane material from the body of the chords as they left the relative stability and support of the 8D lattice. There would have been a *de-pressurisation* within their new surroundings compared to that of the 8D lattice (in which the boundary chords were immersed in a denser membrane medium). As a result, this process of de-gassing would release a proportional amount of the boundary chord material (the secondary membrane condensate) into their new environment.

All boundary chords (both independent and locked-in varieties) would be born within the 8D lattice and comprise the same *mass equivalence*, originating from the area rule of their tri-planar coordinates. This would allow the area calculation to produce an *HSH* value that now equates to 0.4330×10^{-09} for the 'H' component and 0.2500 x 10-09 for the 'S', or overall:

$$(4.330 \times 10^{-10}) \times (2.500 \times 10^{-10}) \times (4.330 \times 10^{-10})$$

$$= \mathbf{4.687 \times 10^{-29}}$$

As it has already been argued that the boundary chord volume was equal to the boundary chord mass during the early stages of cosmic evolution, then:

$$M^{dbc} = 4.687 \times 10^{-29}\ kg$$

and this would have been the same for all locked-in (whole surviving teddy chords) *AND* the independent dimensional boundary chords. The more massive and structurally complex teddies would undergo a *de-gassing* process that involves two-dimensional areas *within* the confines of their circular chords (explored previously in Chapter Nine), while the independent dimensional boundary chords *(IDBCs)* are singular and open ended (unlike the closed varieties of the teddy). Each chord must therefore produce its own two-dimensional component during de-gassing.

Each dimensional boundary chord (independent or otherwise) can also be considered as being made up from its *three* tri-planar coordinate components, *H + S + H* and these too, can also be considered as contributing a de-gassing component. As far as the overall chord is concerned, the 'H' contributes *38.8%* of this value while the 'S' provides *22.4%*. Unlike the teddy's chord, which will be found to contribute a single-dimensional de-gassing component (and thus a mass conversion factor of 10^3), the independent boundary chord *(IDBCs)* must produce the entire two-dimensional *de-gassing component* and *ITS* mass conversion factor must be 10^2. This will result in an independent dimensional boundary chord *(IDBC)* two-dimensional de-gassing component of:

$$\frac{4.687 \times 10^{-29} \times 0.388 \quad (H)}{10^2}$$

$$\frac{4.687 \times 10^{-29} \times 0.224 \quad (S)}{10^2}$$

which equates to a value of:

$$1.818 \times 10^{-31} \text{ kg } (H)$$
$$1.818 \times 10^{-31} \text{ kg } (H)$$
$$1.049 \times 10^{-31} \text{ kg } (S)$$

or an overall *de-gassing component* of : $\mathbf{4.685 \times 10^{-31}}$ **kg**

This will occur with each and every independent dimensional boundary chord almost at the instant of the big-ping, which will give these entities a new mass value that equates to 4.687×10^{-29} minus 4.685×10^{-31} *kg* or a value of:

$$\mathbf{4.640 \times 10^{-29} \text{ kg}}$$

Although this two-dimensional mass conversion has been calculated on *each* of the *HSH* tri-coordinate string components that make up the boundary chord; taking the mass as whole produces exactly the same result (i.e. an apparent mass loss of 4.685×10^{-31} *kg*).

As this de-gassing occurs, the *IDBC* will begin to undergo what can be called an ***elastic rebound event***, as it endeavours to return to its original size and this will occur prior to the 4D induced de-gassing process - which is in turn, a result of its new surroundings. This rebound would be massive when the individual sizes of these chords are taken into consideration. The original boundary chord length would have been in the region of 10^{-14} *cm* when they first began to condense out of the 8D secondary condensate. The big-ping would coincide with a chord length of *c.*10^{-10} *cm* (when they appear in our 3D space) and the elastic rebound that followed, would shrink them back to their original condensation point of c. 10^{-14} *cm* in what would be the first of another two-stage event. This first event would span perhaps *FOUR* full magnitudes with regard to scale and as well as the boundary chord experiencing an initial mass loss that has been calculated above at 4.685×10^{-31} *kg* during the de-gassing phase, it would quickly lose additional mass in a 'runaway' rebound induced series of events.

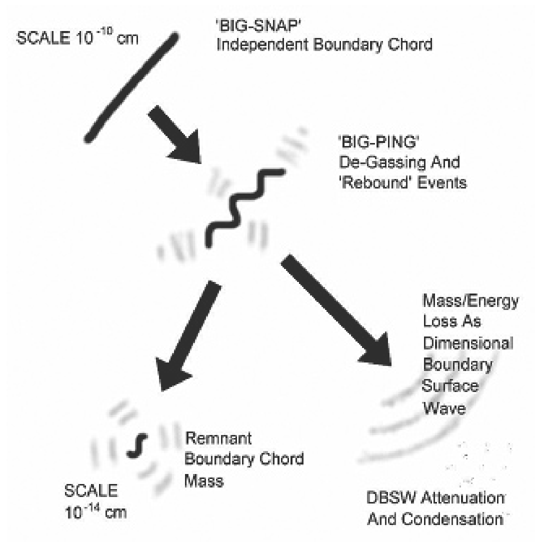

Figure 11.2.01 *As independent boundary chords manifest themselves into what would become our 3D/4D universe, they would undergo a massive rebound as they shrank back to their original size. They would also emit energy in the form of a dimensional boundary surface wave as they begin to vibrate energetically.*

11.3 Mass conversion factors

So far, mass conversion factors have been used to describe the difference between one, two and three-dimensional mass equivalents, but things change slightly when dealing with *trans* 3D concepts. While positive indices have been used to describe the lower dimensional energy levels (i.e. those 'weaker' than our own three-dimensional level), a *negative* index will be required to allow a conversion to higher levels, especially when dealing with dimensional boundary surface wave energies that must propagate at the 3D/4D boundary in their least energetic state. Whereas indices of 10^{1}, 10^{2} and 10^{3} have been used thus far, a change of sign will be required for the 4D level, which will give a 4D conversion factor of $\mathbf{10^{-04}}$.

Four-dimensional energy is also *expansional* in this model and this will necessitate an additional descriptive element, which will involve *squaring* the conversion factor thus:

$$(10^{-04})^2$$

This will now allow mass conversion from 3D to 4D levels and will be made use of later in this chapter.

The *elastic rebound* will release potential energy and this will be translated into chord resonance. As it vibrates, it is possible that the original boundary strings from which the chord was originally made will separate and each will undergo their *own* evolutionary change. This vibration will excite these string components and their energy level will increase accordingly.

This raised dimensional energy level will more or less coincide with that of the 3D/4D boundary and it will thus propagate as a dimensional boundary surface wave (a dim-wave). The boundary chord (or its *tri-planar coordinate* string components), will begin to lose mass as this is translated into dimensional energy. This is the start of a 'runaway' effect as the frequency of vibration increases as the string in question becomes less massive. This is similar to the effect of *twanging* your ruler on the edge of your desktop and drawing it sharply inwards, effectively shortening the length of the ruler's overhang. As you do this, the pitch of the twanging sound rises - the shorter this overhang becomes. The *higher* the frequency of vibration, the *greater* the energy - and the *faster* the mass translation.

As this increase continues, a point will be reached where the energy level of the dim-wave will be sufficiently high enough to *jump* from its position at the 3D/4D boundary, to that separating the fourth and fifth dimensions. Such a higher energy dimensional boundary surface wave will now exhibit characteristics that are both expansional *AND* compressional (or attractive) in nature and each will now cancel or balance the other out. The 'runaway' effect of increasing frequency and mass loss will cease and the boundary chord (or now its separate components) will become stable. Its new, resultant mass can be described by the expression:

$$\frac{M^{dbc}\Delta}{(10^{-04})^2}$$

where M^{dbc} is the boundary chord's original starting mass (after the de-gassing phase); Δ is the 'H' or 'S' component's *area of influence* in three-dimensional space and the $(10^{-04})^2$ represents the square of the 3D to 4D mass conversion factor.

11.4 Electron and IDBC masses

The 'H' or 'S' component area of influence indicates that it is possible to arrive at a resultant mass along one of two paths - corresponding to either the 'H' string or 'S' string component that makes up the boundary chord that by this time, may have shaken itself into these three constituent parts. The resultant mass equivalents will therefore be either:

$$\frac{4.640 \times 10^{-29} \ \times \ 3.926 \times 10^{-10}}{(10^{-04})^2} = \mathbf{1.821 \ \times 10^{-30} \ kg}$$

or:

$$\frac{4.640 \times 10^{-29} \ \times \ 1.963 \times 10^{-10}}{(10^{-04})^2} = \mathbf{9.108 \ \times 10^{-31} \ kg}$$

This seems to suggest that the resultant mass of the Stage 2 reconfigured independent dimensional boundary chord, can be equivalent to either *twice* the electron's mass (following the 'H' component path), or almost *exactly equal* to the conventional electron's mass - if the 'S' component's path is followed instead. This would suggest that this chain of events produces a mixture of *1e* and *2e* masses as a direct result of the independent boundary chords pinging into 3D space. It also infers that the early cosmos, not long after what has been called the big-snap and the big-ping in this model, was awash with a combination of protons (reconfigured whole surviving teddies); occasional neutrons (Stage 1 reconfigured teddies) *AND* electron and double electron sized entities. This would constitute a pretty good selection of fundamental building blocks that would soon become available for the element building processes that would later commence during a subsequent evolutionary stage of the universe. We should be cautious however, because the availability of such animals does not automatically infer that element building proceeded in a 'matter of fact' way because of this sudden availability. There would indeed be 'capture' events, but these would be the result of rather subtle processes that will be illustrated within the next chapter.

These alternative 'H' and 'S' routes to the final mass equivalence of the independent dimensional boundary chords, provides what could be a clue to a slightly more 'involved' evolutionary process regarding the separation of these elements during the big-snap. It was earlier argued that such a break-up would involve a *build-unit* comprising a total of fourteen teddies (a whole surviving teddy plus thirteen teddy volumes), which seems to be the only satisfactory way of gaining an insight into producing a separation within such an 8D lattice that results in a percentage of whole surviving teddies as well as independent dimensional boundary chords (see *Figure 11.4.01* in the next column).

This separation however, may not be quite as straightforward as it would at first appear. Each *build-unit* of fourteen teddy volumes within the lattice, is part of a great net-like structure made entirely from connected boundary chords (more or less as one complete chord). In order to achieve the required ratio of whole surviving teddies *(WSTs)* to *IDBCs*, only the central member of the fourteen volumes can remain whole, while the other thirteen must be sacrificed. These sacrificial teddy volumes however, actually *share* chords with members of an adjacent build-unit and a kind of tug-o-war would ensue between separating chords.

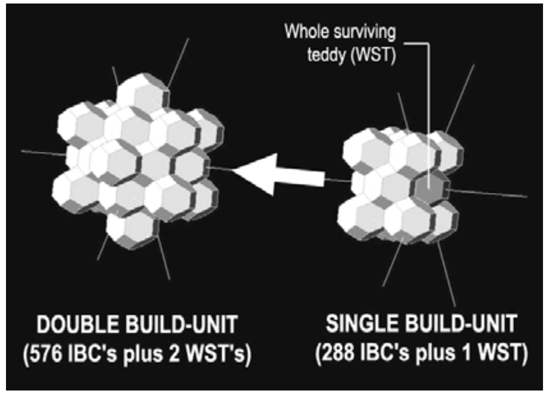

Figure 11.4.01 *In order to provide a ratio of whole surviving teddies (WSTs) as well as IDBCs; a build-unit of fourteen teddy volumes will be all that is required to construct an 8D lattice of infinite size. This also means that eight times the mass of each WST will become independent boundary chords.*

This could mean that in certain areas and under certain conditions, boundary chords are actually *ripped-apart* during the big-snap as they are trying to be shared by different separation points. This could also mean that there might actually be several different varieties or types of resultant independent boundary chords, each made-up from a combination of the original *'HSH'* string components (see *Figure 11.4.02* on the following page).

This would allow for a total of *FIVE* different varieties of independent boundary chords with the configurations shown in *Figure 11.4.02*, all of which would undergo a process of rebound. In this scenario, the least numerous, would probably be the complete *'HSH'* (original) variety of *IDBCs*.

These entities are by their very nature *acicular* and thus strictly follow the teddy's *constant motion axes* first described within Chapter Nine. This could mean that their true mass is difficult to calculate, unless they happen to be influenced by some other process or event. The 'H' string and the 'S' string have already been described on page 89 above and this would leave a further three varieties to be examined; these being the *'HS'*; the *'HH'* and the original *'HSH'*. Their own evolution would be similar to that of the other two, although their combination of remaining string components, may affect their resulting individual mass equivalents quite markedly. This will need to be explored in detail at a later date and will probably be included within what is planned to be *Volume II* of this trilogy - after a more thorough examination of these particular components has been undertaken.

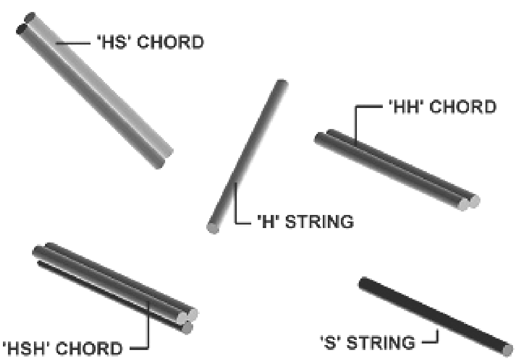

Figure 11.4.02 *Resultant independent dimensional boundary chords may be of five different varieties as they are ripped-apart during the big-snap event, prior to dropping to our own 3D level.*

The electron masses that would seem to be related to the 'H' and ''S' string *IDBCs*, cannot at this stage, be classified as electrons proper, as they would not (as yet), be able to exhibit any of their usual characteristics of charge. This would come later as the interplay between these fundamental particles continued and this particular subject will be discussed further in the next chapter.

With *eight times* the overall mass of all the whole surviving teddies (now the protons and neutrons in our world), this *IDBC* material becomes a logical candidate for the definition of ***dark matter***. Such a claim is not however, quite as straightforward as one would have liked, because there will be other candidates too and these will also have to be taken into consideration when discussing this elusive material. We also have to account for a bulging catalogue of other sub-atomic particles; some of which, have fleetingly short half-lives that will at first sight, seem difficult to reconcile within the confines of this particular model. The positron and neutrino however, will be easier to deal with and it will be argued in due course that these entities too, have an origin that involves the independent boundary chords.

11.5 Exotic segments

Most of us are familiar with 'atom-smashers' and the proton-to-proton collisions that occur within these particle accelerators. As these machines grow in power, the greater seems to be the number of 'exotic' particles that are detected as a result of such violently induced events. There was a time when one of these new exotics was discovered almost every week and their catalogue has grown many fold over the years. Consider though, the implications of two approaching protons that are each made from thirty-six boundary chord values.

Instead of a 'point-particle' that may comprise a collection of smaller sub-atomic components (such as the quarks), the protons involved in *these* controlled collisions, will be evolved whole surviving teddies. Even during the embryonic stages of the universe, conditions and velocities such as those now experienced within the coils of such accelerators would probably have been very rare and the chances of such high-speed collisions actually occurring in nature, may not really have been that great (or at least, certainly not within this model). We are thus provided with an artificially induced collision, the outcome of which would be dependent on the characteristics of the approaching bodies in the first place - and this may produce all kinds of boundary chord reactions. This has already been looked at briefly during the early months of last year (2006) and consequently, I have (perhaps not surprisingly) called these resultant animals ***exotic segments*** and they will be seen to closely involve the concepts of *hadronic scattering* and *string history* *pictures*. In the boundary chord model then, this type of proton-proton collision, will result in what are basically ***broken teddies***.

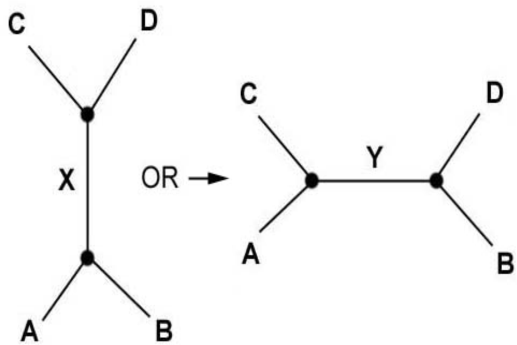

Figure 11.5.01 *Specific resonances A & B can have intermediate particles (X or Y in the diagram) which may decay to produce new short-lived particles C & D. These are usually referred to as Feynman graphs.*

This branch of physics amongst other things, deals with certain particles that have been shown to have the observational curiosity of being relatively short-lived (lasting for only about *circa* 10^{-23} seconds or so) and these are often referred to as resonances. ***Hadronic scattering*** describe the processes and the actions of specific particles that may come together for what is a fleeting moment during collision and in so doing, may convert to another pair of particles via an intermediate stage. More often than not, these actions can be represented as Feynman graphs[1] (or diagrams). They may produce what is termed an *intermediate particle* (*X* or *Y* for example), which almost at once, decays to result in particles *C* and *D* (see *Figure 11.5.01* above).

These diagrams represent a chain of events and ***string history pictures***[2] are basically another way of looking at what is going on within these Feynman graphs. String history pictures too, depict these hadronic processes and these especially, seem to have an uncanny resemblance to sections of the teddy if one imagines these entities to be 'blown apart' during such violent collisions. They include more complex varieties than those illustrated in the above figure (such as those usually labelled Z^1 and Z^2) and the whole concept of short-lived 'string segments' if you like, fits in rather well with the picture of proton constructed entirely from boundary chords.

Playing about with such broken teddies, one is struck with the wealth of possibilities. One such encounter would involve components from both 'H' and 'S' face chords and such an animal would probably tend to ‘uncurl’ itself, as it became detached from the body of the teddy. Drawing out one these segments in my notebook one afternoon, my wife, looking over my shoulder; quite innocently asked me why I was drawing a 'telly-tubby', which for those who have not encountered them, were a young children’s TV craze that hit the UK during the nineties and early noughties (see *Figure 11.5.02* below).

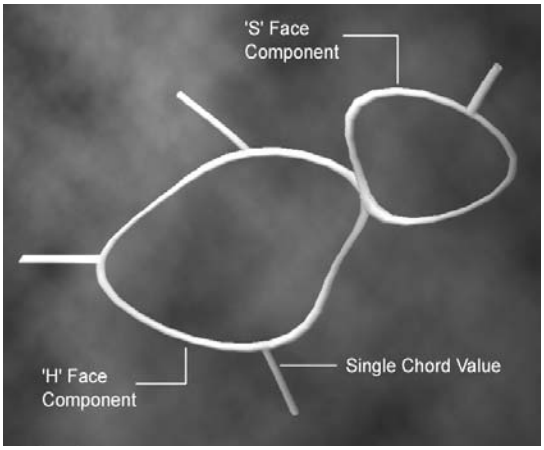

Figure 11.5.02 *One of the largest 'exotic segments' from a single teddy will include both 'H' and 'S' face chords and has been said to resemble a children's 'telly-tubby' character.*

After that, I was of course, tempted to call these exotic segments *'tubbies'* in which case, I would have both 'teddies' *and* 'tubbies' in my repertoire but, being worried about the possibility of treading on someone's toes regarding copyright, I resisted the temptation. Tubbies or not, these exotic segments didn't really have to stop at originating from just a single proton, as such violent encounters now common-place within our particle accelerators, could perhaps fuse multiple teddies because of their open, almost 'wireframed' appearance. There are obviously questions as to configuration and of course mass to deal with here, such as the *189x* plus apparent proton masses of the *top quark* for example. However, this particular line of thought is still at the moment, 'work in progress' and has some way to go before I can be confident in what I am trying to say. For this reason, this particular topic must be reserved for a much later submission.

I have probably digressed for long enough now and we should return to this model's evolution of the material that would ultimately produce the galaxies, the stars, planets and us. This would now involve interplay between the whole surviving teddy, the independent boundary chords and the dimensional boundary surface waves. This would result in the appearance of what can broadly be called the atom's *electron shell*.