Exploration

The natural exponent e is defined in the inversion of scale parameter $1/a = \{1+1/n\}$

$e = \lim_{n\to\infty} \{1+1/n\}^n$ **for** $e = \{1+1/n\}$ **for** $x=1=hf/kT$ **in Planck's Radiation Law for a Black Body**

$e-1=1/n$ for $n=1/[e-1] = 1/Y^{n'} = X^{n'}$

$n' = \ln(e-1)/\ln Y = 1.12492010..$ **for a time coordinate 0.0075 or about 126.58 Million years ago**

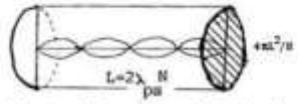
$$e^{\frac{hf}{kT}} = 1 + \frac{1}{n} \quad \text{for } n(f,T) = \frac{1}{e^{hf/kT}-1} \qquad \text{(Eq.\#26)}$$

Now consider the universe as a Black Body or a particle in a quantum box, the box being of course the quantumspace boundary r_{max}, itself bounded by omnispace as the 11-dimensional supermembrane, with 28 7-spheres relating to 26 bosonic dimensions via the quantization of Prime numbers as encountered.

The U-Field is quantized into 12-intersecting unified current loops and the extent is $4\lambda_{ps}=4\times10^{-22}$ m*.

We so consider the frequency interval $2\lambda_{ps}N$ and the "volume" of the black box is quantized

$N = L/2\lambda = Lf/2c$ with $dN = L.df/2c$ for $N^2 dN = (L^3 f^2/8c^3)\,df$



Surface Area of a sphere as octant of a cubic box volume L^3

Now the "volume" of the box is $L^3/8$ and our dimensionless volume becomes the Number of FREQUENCY STATES for a black body with frequencies in the interval df. Since the temperature for a given frequency interval determines the distribution of the radiation spectrum, we determine the spectral distribution dE/df via

As a photon has two quantum polarization spin momenta, the Frequency States are doubled.

Frequency States $2\times4\pi N^2 dN = 8\pi L^3 f^2/8c^3\, df$

The number of photons in df: $\frac{8\pi f^2(V)}{c^3} \times \frac{1}{e^{hf/kT}-1}\, df = dP$

$dE = hf\, dP = \frac{8\pi h.V}{c^3} . \frac{f^3}{e^{hf/kT}-1}\, df$

and the total energy in the cubic black box is:

$$E = \int_0^\infty dE = \frac{8\pi hV}{c^3} \int_0^\infty \frac{f^3}{e^{hf/kT}-1}\, df \qquad \text{(Eq.\#27)}$$

Since we evaluate for a given T, we set $u=hf/kT$ and $du=(h/kT)df$

and we need to evaluate the proportionality constant via the integral $\int_0^\infty \frac{u^3}{e^u-1}\, du$

This can be written as: $\int_0^\infty \frac{u^3}{e^u-1}\, du = \Gamma(3+1)\zeta(3+1)$

The GAMMA function $\Gamma(x)$ satisfies the form: $x = \frac{\Gamma(x+1)}{\Gamma(x)}$ as analogue to our $\frac{n+1}{n} = 1 + \frac{1}{n}$

generally $\Gamma(x) = \int_0^\infty t^{x-1} e^{-t}\, dt$ and for n a positive integer then $\Gamma(n+1)=n!.\Gamma(1)=n!$

The ZETA function of Riemann is defined as $\zeta(z) = \sum_{n=1}^\infty 1/(n^z)$

We require $\Gamma(4).\zeta(4) = 3! . \sum_{n=1}^\infty 1/n^4 = 3!.(1/1 + 1/2^4 + 1/3^4 + ... + 1/n^4 ...)$.

This we derive via the function $f(x)=x^4$ and the application of Fourier Series in cos(nx)

$f(x)=x^4$ with period 2π, then $a_n = \frac{1}{\pi}\int_0^{2\pi} x^4.\cos(nx)dx = \frac{1}{\pi}\left\langle \frac{4x^3}{n^2} - \frac{24x}{n^4} \right|_0^{2\pi} = \frac{32\pi^2}{n^2} - \frac{48}{n^4}$

for $n=0$, $a_0 = \frac{1}{\pi}\int_0^{2\pi} x^4\, dx = \frac{32\pi^4}{5}$

$f(x)=x^4 = \frac{1}{2}a_0 + \sum_{n=1}^\infty a_n.\cos(nx) = \frac{16\pi^4}{5} + \sum_{n=1}^\infty \left(\frac{32\pi^2}{n^2} - \frac{48}{n^4}\right).\cos(nx)$

$f(0)=f(2\pi)=\frac{1}{2}(0+16\pi^4)=8\pi^4$ (Dirichlet Condition) and we use the result $\sum_{n=1}^\infty \frac{1}{n^2} = \frac{\pi^2}{6}$ and obtained similarly in setting $f(x)=x^2$.

Then for f(0), we have $\frac{24\pi^4}{5} = 32\pi^2.\frac{\pi^2}{6} - 48\sum_{n=1}^\infty \frac{1}{n^4}$ and $\sum_{n=1}^\infty \frac{1}{n^4} = \frac{\pi^4}{90}$

Total Energy $E = \frac{3!\,\pi^4 V.8\pi k^4 T^4}{90 h^3 c^3} = \frac{4V}{c}\left[\frac{2\pi^5 k^4}{15 h^3 c^2}\right] T^4 = \frac{4\sigma V T^4}{c}$

Stefan-Boltzmann Constant σ

$\frac{\text{Radiation Energy}}{\text{Matter Energy}} = \frac{4\sigma T^4}{m_c Y^n c^3}$ **for Radiation Pressure = Matter Pressure**
Early Universe Later Universe

$T_{Equilibrium} = \sqrt[4]{18.20\,\frac{(n+1)^2}{n^3}} = \sqrt[4]{\frac{m_c Y^n c^3}{4\sigma}}$ $\quad \frac{n^3 Y^n}{n^2+2n+1} = \frac{72.80\sigma}{m_c c^3} = (1.65107\times10^{-4})\,(K^4/V)^*$

A Cosmic Background temperature of 18.35 Kelvin* for a cycle coordinate of 0.056391 and as 0.056391(16.88 Gy) or 951.2 Million Years after the Instanton to begin the birthing of galaxies

Evolution

In the early radiation dominated cosmology; the quintessence was positive and the matter energy dominated the intrinsic Milgröm deceleration from the Instanton $n=n_{ps}$ to n=0.18023 (about 3.04 Billion years) when the quintessence vanished and including a Recombination epoch when the hitherto opaque universe became transparent in the formation of the first hydrogen atoms from the quark-lepton plasma transmuted from the X-L Boson string class HO(32) of the Inflaton epoch preceding the Quantum Big Bang aka the Instanton.

From the modular membrane duality for wormhole radius $r_{ps} = \lambda_{ps}/2\pi$, the critical modulated Schwarzschild radius $r_{ss} = 2\pi\lambda_{ss} = 2\pi x10^{22}$ m* for $\lambda_{ps} = 1/\lambda_{ss}$ and for an applied scale factor a = $n/[n+1] =\lambda_{ss}/R_H = \{1-1/[n+1]\}$ for a $n=H_ot$ coordinate $n_{decomax} = 6.259485x10^{-5}$ or about $6.259485x10^{-5}$(16.88 Gy) = 1.056601 Million years attenuated by exp{-hf/kT} = e^{-1} = 0.367879 to a characteristic cosmological time coordinate of 0.36788x1.056601 = 388,702 years after the Instanton n_{ps}.

The temperature for the decoupling is found in the galactic scale-limit modular dual to the wormhole geodesic as $1/\lambda_{wormhole}=\lambda_{antiwormhole}=\lambda_{ss}=10^{22}$ meters or so 1.06 Million ly and its luminosity attenuation in the 1/e proportionality for then 388,588 lightyears as a decoupling time $n_{recombination}$ or $n_{decomax}/e$.

A maximum galactic halo limit is modulated in $2\pi\lambda_{antiwormhole}$ meters in the linearization of the Planck-length in the conformal mapping of wavelength λ_{ps} in the wormhole radius $r_{ps}=\lambda_{ps}/2\pi$.

$R(n_{decoupling})=R_H\{n_{decoupling}/(n_{decoupling}+1)\} = 10^{22}$ meters for $n_{decoupling}=6.2595x10^{-5}$ and so for a CMBBR-Temperature of about T=2935 K* for a galactic protocore then attenuated for $n_{decouplingmin}=n_{decomin}=9.962x10^{-6}$ for $R=\lambda_{ss}/2\pi$ and $n_{decomax}=3.9x10^{-4}$ for $R=2\pi\lambda_{ss}$ and for temperatures of so 11,648 K and 740 K respectively, descriptive of the temperature modulations between the galactic cores and the galactic halos.

So a CMBBR-temperature of so 11,648 K at a time of so 168,114 years defined the initialization of the VPE and the birth of the first ylemic protostars as a decoupling minimum. The ylemic mass currents were purely monopolar and known as superconductive cosmic strings, consisting of nucleonic neutrons, each of mass m_c.

If we assign this timeframe to the maximized ylemic radius and assign our planetesimal limit of fusion temperature 1.2 Billion K as a corresponding minimum; then this planetesimal limit representing the onset of stellar fusion in a characteristic temperature, should indicate the first protostars at a temperature of the CMBBR of about 740 Kelvin.

The universe had a temperature of 740 K for $n_{decouplingmax}=3.9x10^{-4}$ for $R=2\pi\lambda_{antiwormhole}$ and this brings us to a curvature radius of so 6.6 Million lightyears and an 'ignition-time' for the first physical ylemic neutron stars as first generation protostars of so 7 Million years after the Big Bang.

The important cosmological consideration is that of distance-scale modulation. The Black Hole Schwarzschild metric is the inverse of the galactic scale metric. The linearization of the PlanckString as the Weyl-Geodesic and so the wormhole radius in the curvature radius R(n) is modular dual and mirrored in inversion in the manifestation of galactic structure with a nonluminous halo a luminous attenuated diameter-bulge and a super luminous (quasar or White Hole Core).

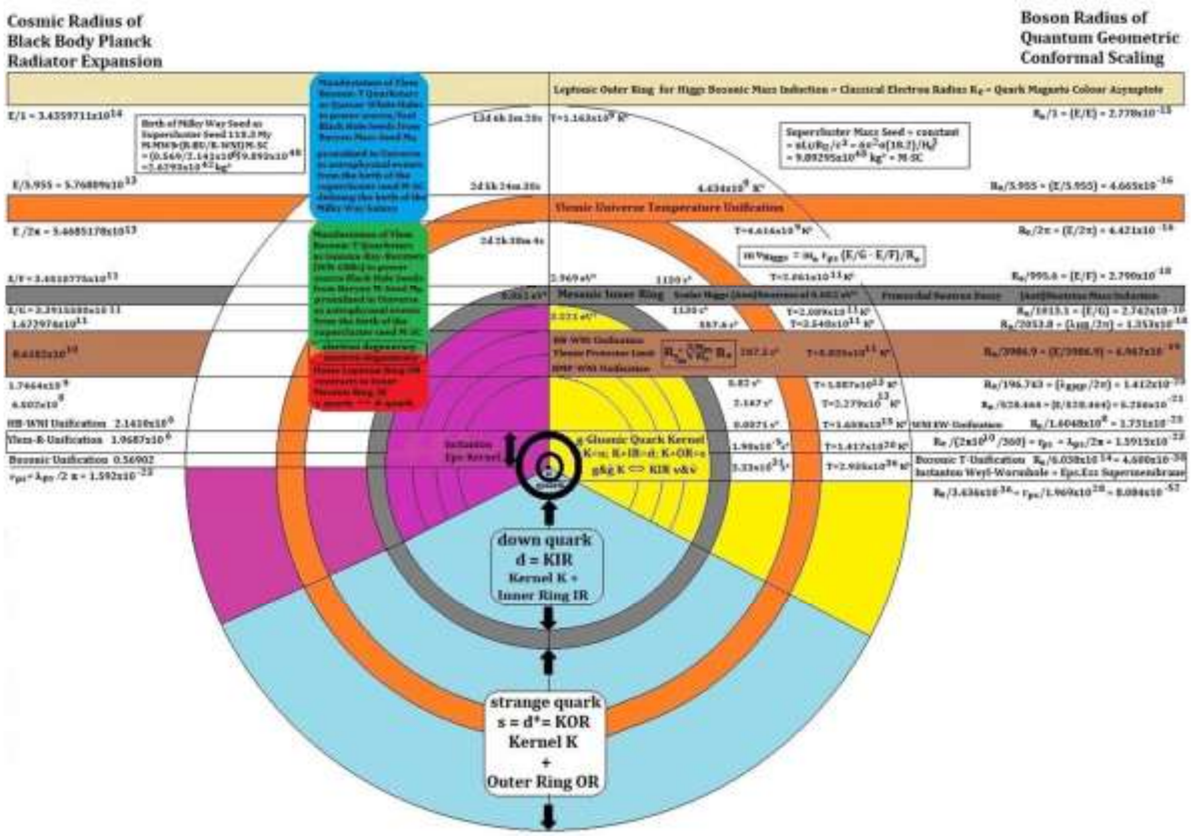
The core-bulge ratio on the scale of 3/550 to 0.002 to 0.001 will so reflect the eigen energy quantum of the wormhole as a heterotic Planck-Boson-Weyl-String or as the magneto charge as 1/500, being the mapping of the Stoney-Planck-Length-Bounce as $e=l_P.c^2\sqrt{Alpha}$ onto the electron radius in $e^*=2R_e.c^2=1/E_{ps}=\lambda_{ps}/hc$ in the modular string-T-duality applied to the self-dual monopole as string class IIB.

The attenuation of the recombination coordinate then gives the cosmic temperature background for this epoch in the coordinate interval for the curvature radius $R(n=9.962x10^{-6}) = 1.5915x10^{21}$ m* to $R(n=6.259485x10^{-5}) = 10^{22}$ m* for the Dark Energy galactic halos emergent from their Black-Hole-White Hole VPE precursors.

The DEBH halos then encompass Outer- and Inner Dark Matter Halos around Baryonic Matter Inner Bulges at characteristic displacement scales of a $9.9854x10^{20}$ m* DMOH at 105.476 years and a redshift of 399 encompassing a $4.9927x10^{20}$ m* DMIH-GDisk at 52,738 years and a redshift of 565 about a $9.985x10^{19}$ m* BMIH-GBulge at 10,548 years and a redshift of 1254.

This radial displacement scale represents the size of a typical major galaxy in the cosmology; a galactic structure, which became potentialized in the Schwarzschild matter evolution and its manifestation in the ylemic prototypical first generation magnetar-neutron-blazar stars, whose emergence was solely dependent on the experienced cosmic temperature background and not on their mass distributions.

Quantum Geometric Temperature-Radius/Displacement Unification



Cycle time $n=H_ot$	**Time t**	**Comoving/ (H)ubble Redshift z √{1+2/n[n+2]}-1**	**Contracted dS deSitter Scale Hubble Radius Universe R_U R_H{n/(n+1)} nR_H expanding AdS m***	**Radius Ylem R_y √{$kT_UR_e^3/G_om_c^2$}**	**BlackWhite Hole Curvature Mass BHW $R_c=R_y$ M_c $R_yc^2/2G_o$ kg***	**BHWHawking Temperature T_H $hc^3/4\pi G_okM_c$ K***	**Temperature Universe T_U ∜{18.2$(n+1)^2/n^3$} K***	**Temperature Ylem T_{ylem} ∜{$3\pi R_U^2T_U^4/2R_yR_s$} K***	**Luminosity Universe L_U $6\pi^2R_U^2\sigma T_U^4$ W* Supercluster Mass Seed M_{SC}=constant $nL_UR_U/c^3=6\pi^2\sigma(18.2)/H_o^3$ 9.89295 x10^{48} kg***	**Luminosity Ylem L_y $4\pi R_y^2\sigma T_y^4$**	**Quantum Geometry Displacement Scaling m***
$n_{present}=n_p$ 1.132711 $1+\Delta_{Sun+Earth}$	19.116 Gy	0.25045 comoving H projected 0.00000 Local Flow	8.4855x10^{25} dS 1.8097x10^{26} AdS	0.0871	3.529x10^{25}	0.0259	2.747 T_UT_H=2.7211	4.718x10^7	1.476x10^{48} dS 6.7813x10^{48} AdS	2.871x10^{22}	
1.0070075 1+0.0070075 $1+\Delta_{MilkyWay}$ Inflaton Mirror $½q_o=¼\Omega_o$ Synchronize 12D|11D|10D Khaibit - Universe Ø=$2R_H$	16.994 Gy	0.28860 comoving H projected 0.10298 Local Flow	8.0163x10^{25} dS 1.60887x10^{26} AdS	0.0897	3.633x10^{25}	0.02514	2.911 T_UT_H=2.8859	4.824x10^7	1.661x10^{48} dS 6.691x10^{48} AdS	3.328x10^{22}	

Evolution

1	16.876 Gy	0.29099 H	$7.9884x10^{25}$ dS $1.5976x10^{26}$ AdS	0.0899	$3.641x10^{25}$	0.02508	2.921 T_UT_H=2.8959	$4.829x10^7$	$1.672x10^{48}$ dS $6.688x10^{48}$ AdS	$3.356x10^{22}$	
0.9929925 **1-0.0070075** **1-**	16.758 Gy	0.29342 H	$7.9603x10^{25}$ dS $1.5865x10^{26}$ AdS	0.0900	$3.645x10^{25}$	0.02505	2.931 T_UT_H=2.8959	$4.836x10^7$	$1.683x10^{48}$ dS $6.685x10^{48}$ AdS	$3.383x10^{22}$	

$\Delta_{MilkyWay}$ **Inflaton Mirror** **$½q_o=¼\Omega_o$** **Synchronize 12D|11D|10D** **Khaibit-Universe** **$Ø=2R_H$**											
0.87430 **1-$\Delta_{Sun+Earth}$** **+$\Delta_{Milky Way}$**	14.755 Gy	0.34010 H	$7.4526x10^{25}$ dS $1.3968x10^{26}$ AdS	0.0930	$3.766x10^{25}$	0.02425	3.127 T_UT_H=3.1028	$4.952x10^7$	$1.911x10^{48}$ dS $6.714x10^{48}$ AdS	$3.969x10^{22}$	
$n_{nodalimage}$ for inflaton **n_{niinf}=0.86732-n_p** **1-$\Delta_{Sun+Earth}$**	14.637 Gy	0.34323 H	$7.4207x10^{25}$ dS $1.3857x10^{26}$ AdS	0.0932	$3.775x10^{25}$	0.02419	3.140 T_UT_H=3.1158	$4.958x10^7$	$1.927x10^{48}$ dS $6.719x10^{48}$ AdS	$4.009x10^{22}$	

0.8602865 1-$\Delta_{Sun+Earth}$ - $\Delta_{MilkyWay}$	14.51829 Gy Age of Sun+ Earth 19.1158 - 14.5183 4.5975 Gy	0.34640 H	7.3884x10^{25} dS 1.37446x 10^{26} AdS	0.0934	3.782x 10^{25}	0.02415	3.154 T_UT_H=3.1299	4.966x10^7	1.944x10^{48} dS 6.728x10^{48} AdS	4.055x 10^{22}	
0.76078	12.839 Gy	0.3972 H	6.9031x10^{25} dS 1.2155x10^{26} AdS	0.0964	3.904x 10^{25}	0.0234	3.365 T_UT_H=3.3416	5.082x10^7	2.199x10^{48} dS 6.818x10^{48} AdS	4.734x 10^{22}	
⅔	11.251 Gy	0.4577 H	6.3907x10^{25} dS 1.0651x10^{26} AdS	0.0999	4.046x 10^{25}	0.0226	3.614 T_UT_H=3.5914	5.205x10^7	2.507x10^{48} dS 6.964x10^{48} AdS	5.594x 10^{22}	
½	8.438 Gy	0.6125 H	5.3256x10^{25} dS 7.9884x10^{25} AdS	0.1084	4.390x 10^{25}	0.0208	4.254 T_UT_H=4.2332	5.480x10^7	3.343x10^{48} dS 7.522x10^{48} AdS	8.093x 10^{22}	
0.26542	4.479 Gy	1.080 H	3.3511x10^{25} dS 4.2406x10^{25} AdS	0.1318	5.338x 10^{25}	0.0171	6.283 T_UT_H=6.2659	6.114x10^7	6.298x10^{48} dS 1.008x10^{49} AdS	1.854x 10^{23}	
$n_{galaxypeak}$ for DE=min n_{gp}= 0.2389	4.0317 Gy	1.177 H	3.0808x10^{25} dS 3.8168x10^{25} AdS Galaxy Cell Scale	0.1364	5.524x 10^{25}	0.0165	6.728 T_UT_H=6.7115	6.224x10^7	6.999x10^{48} dS 1.074x10^{49} AdS	2.132x 10^{23}	

$n_{nodalimage}$ for instanton n_{niins}=0.13271 n_p-1 $\Delta_{Sun+Earth}$	2.2396 Gy	1.840 H	$1.8719x10^{25}$ dS $2.1203x10^{25}$ AdS Galaxy Group Scale	0.1662	$6.731x10^{25}$	0.0136	9.998 $T_U T_H$=9.9844	$6.862x10^7$	$1.260x10^{49}$ dS $1.617x10^{49}$ AdS	$4.677x10^{23}$	
n_{galaxy} for DE=0 n_g=0.10823	1.8265 Gy	2.125 H	$1.5603x10^{25}$ dS $1.7292x10^{25}$ AdS Galaxy Group Seed	0.1785	$7.229x10^{25}$	0.0126	11.523 $T_U T_H$=11.5104	$7.092x10^7$	$1.545x10^{49}$ dS $1.898x10^{49}$ AdS	$6.156x10^{23}$	
n_{EMRMEQ} 0.056389 EMR Pressure= Matter Pressure	951.63 My	3.272 H	$8.528x10^{24}$ dS $9.009x10^{24}$ AdS	0.2252	$9.121x10^{25}$	0.0100	18.346 ~$T_U T_H$=18.336	$7.877x10^7$	$2.965x10^{49}$ $3.309x10^{49}$	$1.491x10^{24}$	
$\Omega_o=M_o/M_H$ 0.028030	473.0 My	5.015 H	$4.3562x10^{24}$ dS $4.4783x10^{24}$ $R_s=R_{sarkar}$ AdS Supercluster Scale	0.2907	$1.177x10^{26}$	$7.758x10^{-3}$	30.571 $T_U T_H$=30.5632	$8.801x10^7$	$5.965x10^{49}$ dS $6.304x10^{49}$ AdS	$3.872x10^{24}$	
$q_o=\Lambda_o/A_{dB}$ 0.014015	236.5 My	7.477 H	$2.2082x10^{24}$ dS $2.2391x10^{24}$ ½R_s AdS	0.3757	$1.522x10^{26}$	$6.000x10^{-3}$	51.062 $T_U T_H$=51.056	$9.816x10^7$	$1.193x10^{50}$ dS $1.227x10^{50}$ AdS	$1.001x10^{25}$	

			Supercluster Seed								
$\frac{1}{2}q_o=\frac{1}{4}\Omega_o$ Synchronize 12D|11D|10D Khaibit-Universe $Ø=2R_H$ $\Delta_{MilkyWay}$ 0.0070075	118.2593 My	10.96687 H	1.11957×10^{24} dS 1.11178×10^{24} AdS Birth of Milky Way Seed as Supercluster Seed $M_{MWS}=(R_{BPTU}/R_{WNI})M_{SC}$ 2.6293×10^{42} kg*	0.485518	1.96635×10^{26}	4.644×10^{-3}	85.27897	1.095×10^{8}	2.386×10^{50} dS 2.420×10^{50} AdS	2.588×10^{25}	
3.933×10^{-4}	6.637 My	49.43 H	$r_{ss}=2\pi\lambda_{ss}$ 6.2807×10^{22} dS 6.2832×10^{22} AdS	1.430	5.792×10^{26}	1.577×10^{-3}	739.7 $\sim T_U-T_H$	1.717×10^{8}	4.254×10^{51} dS 4.257×10^{51} AdS	1.357×10^{27}	
$n_{decomax}$ 6.259×10^{-5} Cosmic EMR Decoupling	1.056 My	125.5 H	$\lambda_{ss}=1/\lambda_{ps}$ 9.999×10^{21} dS DEBH-GHalo 1.000×10^{22} AdS	2.848	1.153×10^{27}	7.920×10^{-4}	2935.3 $\sim T_U-T_H$	2.288×10^{8}	2.671×10^{52} dS 2.671×10^{52} AdS	1.698×10^{28}	

$n_{recombination}$ $n_{decomax}$/e 2.303x10^{-5} Cosmic EMR Decoupling	388,702 y	207.4 H	3.6794x10^{21} dS 3.6794x10^{21} AdS	4.144	1.678x10^{27}	5.441x10^{-4}	6213.0 ~T_U-T_H	2.675x10^{8}	7.260x10^{52} dS 7.260x10^{52} AdS	6.715x10^{28}	

$n_{decomin}$ 9.962x10^{-6} Cosmic EMR Decoupling	168,114 y	315.8 H	$\lambda_{ss}/2\pi=1/2\pi\lambda_{ps}$ 1.59153x10^{21} dS 1.59154x10^{21} AdS	5.674	2.298x10^{27}	3.974x10^{-4}	11,648 ~T_U-T_H	3.049x10^{8}	1.678x10^{53} dS 1.678x10^{53} AdS	2.125x10^{29}	
6.250x10^{-6}	105,476 y	399 H	9.9854x10^{20} DMOHdS 9.9855x10^{20} AdS	6.758	2.737x10^{27}	3.336x10^{-4}	16,524 ~T_U-T_H	3.280x10^{8}	2.675x10^{53} dS 2.675x10^{53} AdS	7.273x10^{29}	
3.125x10^{-6}	52,738 y	565 H	4.9927x10^{20} DMIH-GDisk dS, AdS	8.765	3.550x10^{27}	2.572x10^{-4}	27,790 ~T_U-T_H	3.655x10^{8}	5.350x10^{53} dS, AdS	1.047x10^{30}	
6.250x10^{-7}	10,548 y	1264 H	9.985x10^{19} BMIHGBulge dS, AdS	16.027	6.491x10^{27}	1.407x10^{-4}	92,920 ~T_U-T_H	4.700x10^{8}	2.675x10^{54} dS, AdS	9.572x10^{30}	
2.1506x10^{-12}	13.256 d 1.145 x10^{6} s*	681,898 H	3.4359711x10^{14} R_E-E space quanta dS, AdS	1793.0 Quasar-WH	7.262x10^{29} 0.363 M_{Sun}	1.257x10^{-6}	1.1630x10^{9} ~T_U-T_H	3.347x10^{9}	7.773x10^{59} dS, AdS	3.081x10^{38} Quasar-WH	R_e/1 (E/E) 2.778x10^{-15}

3.6103×10^{-13}	2.225 d 192,270 s*	1.6643×10^{6} H	5.76809×10^{13} R_E-(E/5.955) Δ=2.774 h dS, AdS	3500.9 Quasar-WH	1.418×10^{30}	6.440×10^{-7}	4.434×10^{9} Ylemic Universe Temperature Unification	4.434×10^{9}	4.628×10^{60} dS, AdS	3.618×10^{39} Quasar-WH	R_e/5.955 (E/5.955) 4.665×10^{-16}
3.4228×10^{-13}	2.110 d 182,284 s*	1.6641×10^{6} H	5.4685178×10^{13} R_E-(E/2π) Δ=9986 s space quanta dS, AdS	3571.9 Quasar-WH	1.447×10^{30} 0.723 M_{Sun}	6.311×10^{-7}	4.616×10^{9} ~T_U-T_H	4.472×10^{9}	4.886×10^{60} dS, AdS	3.897×10^{39} Quasar-WH	R_e/2π (E/2π) 4.421×10^{-16}

4.894×10^{-14}	7.240 h 26,064 s*	4.5203×10^{6} H	7.81902×10^{12} R_E(E/43.944) space quanta dS, AdS	7407.41 Neutron Star Blazar-WH Chandrasekhar Limit ρ_{ny}= {$8G_o m_c M^2/m$ ($c^6 R_e^3$)}ρ_{nuc} 159.389ρ_{nuc} 7.381×10^{18} kg*/m³* ρ_{nuc}= M_m/R_{ymax}^3 =m_c/R_e^3 GRB-WH	M_{Mod}= M_m =$M_{chandra}$ =$f_{ps}\|_{mod}$ 3.000×10^{30} 1.500 M_{Sun}	3.044×10^{-7}	1.985×10^{10} ~T_U-T_H	6.060×10^{9}	3.416×10^{61} dS, AdS	5.651×10^{40} Blazar-WH	R_e/43.9442 (E/43.944) 6.321×10^{-17}
1.356×10^{-14}	2.0065 h 7223.4 s*	8.588×10^{6} H	2.16703×10^{12} dS, AdS	11,985.43 ρ_{ny}= 60.880ρ_{nuc} 2.819×10^{18} kg*/m³* Blazar-WH Magnetar TolmanOppenheimer-Volkoff Limit	M_{TOV} $YM_{chandra}$ 4.854×10^{30} 2.427 M_{Sun}	1.881×10^{-7}	5.1968×10^{10} ~T_U-T_H	7.405×10^{9}	1.233×10^{62} dS, AdS	3.299×10^{41} Blazar-Magnetar-WH	R_e/158.56 (E/158.56) 1.752×10^{-17}

Evolution

2.1601x 10$_{-15}$	19.173 m 1150.4 s*	2.152x10^{7} H	3.4510775x10^{11} R_F-F space quanta dS, AdS	23,870.8 ρ_{ny}= 15.347ρ_{nuc} 7.107x10^{17} kg*/m^{3}* GRB-WH Quark-GluonPlasmaStrange Star	9.668x 10^{30} 4.834 M_{Sun}	9.445x10$_{-8}$	2.0614x 10^{11} ~T_U-T_H	9.868x10^{9}	7.740x10$_{62}$ dS, AdS	4.126x 10^{42} GRB-WH QGPS	R_e/995.6 (E/F) 2.790x10$_{-18}$
2.1363x 10$_{-15}$	18.961 m 1137.7 s*	2.164x10^{7} H	3.413055 x10^{11} dS, AdS	23,970.35 ρ_{ny}= 15.221ρ_{nuc} 7.049x10^{17} kg*/m^{3}* GRB-WH QGPS-Star	M_{QGP} 2Y$M_{chandra}$ 9.708x 10^{30} 4.854 M_{Sun}	9.407x10$_{-8}$	2.0786x 10^{11} ~T_U-T_H	9.885x10^{9}	7.826x10$_{62}$ dS, AdS	4.190x 10^{42} GRB-WH QGPS	R_e/1006.7.6 (E/1006.7) 2.759x10$_{-18}$

2.1228x 10$_{-15}$	18.842 m 1130.5 s*	2.170x10^{7} H	3.3915580x10^{11} R_G-G space quanta dS, AdS	24,027.2 ρ_{ny}= 15.149ρ_{nuc} 7.015x10^{17} kg*/m^{3}* GRB-WH QGPS-Star	9.731x 10^{30} 4.866 M_{Sun}	9.384x10$_{-8}$	2.0885x 10^{11} ~T_U-T_H	9.895x10^{9}	7.876x10$_{62}$ dS, AdS	4.227x 10^{42} GRB-WH QGPS	R_e/1013.1 (E/G) 2.742x10$_{-18}$
1.047x10$_{-15}$	9.293 m 557.59 s*	3.090x10^{7} H	1.672974 x10^{11} dS, AdS	31,318.4 ρ_{ny}=8.914 ρ_{nuc} 4.128x10^{17} kg*/m^{3}* GRB-WH QGPS-Star	1.268x 10^{31} 6.342 M_{Sun}	7.202x10$_{-8}$	3.548x10$_{11}$ ~T_U-T_H HBWNI Unification T_{HB}↔M_{HB}	1.105x10^{10}	1.596x10$_{63}$ dS, AdS	1.117x 10^{43} GRB-WH QGPS	R_e/2053.8 (λ_{HB}/2π) 1.353x10$_{-18}$

1.0415x10-15	9.244 m 554.66 s*	3.099x10^7 H	1.664x10^{11} dS, AdS	31,378.3 ρ_{ny}=8.882 ρ_{nuc} 4.113x10^{17} kg*/m^3* ρ_{nucOR}= $m_c/\{XR_e\}^3$ $Y^3 M_m/R_{ymax}^3$ 1.9617x10^{17} QGPS-Star	1.2708 x10^{31} 6.354 M_{Sun}	7.186x10-8	3.562x1011 ~T_U-T_H	1.106x10^{10}	1.604x1063 dS, AdS	1.124x10^{43} GRB-WH QGPS	R_e/2064.4 (E/2064.4) 1.346x10-18
3942x10-16	4.788 m 287.27 s*	4.306x10^7 H	8.6182x1010 dS, AdS	40,162.35 ρ_{ny}=5.423 ρ_{nuc} 2.511x10^{17} kg*/m^3* R_{ymax}= $\{M_{mod}/m_c\}R_e$ =M_m/R_n m_c/R_{e3} 4.6309x10^{16} kg*/m^3* ρ_{nucOR}= $m_c/\{XR_e\}^3$ 1.280.Y^3 M_m/R_{ymax3} 2.511x10^{17} GRB-WH Gamma-Ray-Burster QGPS-Star Limit	1.627x10^{31} 8.133 M_{Sun}	5.614x10-8	5.8353x10^{11} ~T_U-T_H	1.226x10^{10}	3.099x1063 dS, AdS	2.783x10^{43} GRB-WH QGPS Limit	R_e/3986.9 (E/3986.9) 6.967x10-19

5.663×10^{-17}	30.16 s*	1.329×10^{8} H	9.048×10^{9} dS, AdS	93,518.1 $R_y = R_e\sqrt{\{R_e c^2/2G_o m_c\}}$ $\rho_{ny}=\rho_{nuc}$ 4.6309×10^{16} kg*/m^3* neutron degeneracy ρ_{nucOR}= $m_c/\{XR_e\}^3$ 2.980.Y^3 M_m/R_{ymax3} 5.846×10^{17} kg*/m^3* QGP Quark Star R_{ymax}	3.7875 $\times10^{31}$ 18.937 M_{Sun}	2.411×10^{-8}	3.164×10^{12} ~T_U-T_H	1.743×10^{10}	2.953×10^{64}	6.166×10^{44} GRB-WH QGP	R_e/37,975 (E/37,975) 7.315×10^{-20}
1.0931×10^{-17}	5.821 s*	3.025×10^{8} H	1.7464×10^{9} dS, AdS	173,299.6 ρ_{ny}=0.2912$_{nuc}$ 1.349×10^{16} kg*/m^3* ρ_{nucOR}= $m_c/\{XR_e\}^3$ 5.523.Y^3 M_m/R_{ymax3} 1.083×10^{18} QGP Quark Star R_{ymax}	7.0186 $\times10^{31}$ 35.093 M_{Sun}	1.301×10^{-8}	1.0865×10^{13} ~T_U-T_H RMP-WNI Unification $T_{HB}\leftrightarrow M_{HB}$	2.254×10^{10}	1.530×10^{65} dS, AdS	5.920×10^{45} GRB-WH QGP	R_e/196,743 ($\lambda_{RMP}/2\pi$) 1.412×10^{-20}

Evolution

4.0697x 10^{-18}	2.167 s*	4.957x10^{8} H	6.502x10^{8} dS, AdS	251,026.2 ρ_{ny}=0.139$_{nuc}$ 6.427x10^{15} kg*/m^3* ρ_{nucIR}= $m_c/\{½XR_e\}^3$ 8Y$_3$M$_m$/R$_{y3\ max}$ 1.5693x10^{18} kg*/m^3* QGP-Star Limit R$_{ymax}$	1.01666x10^{32} 50.833 M$_{Sun}$	8.982x10^{-9}	2.2796x10^{13} ~T$_U$-T$_H$	2.630x10^{10}	4.109x10^{65} dS, AdS	2.303x10^{46} GRB-WH QGP	R$_e$/528,464 (E/528,464) 5.256x10^{-21}
1.3401x 10^{-20}	1/140.1 0.0071 s*	8.638x10^{9} H	R$_{WNI}$ 2.1410x10^{6} dS, AdS	2.1410x10^{6}	8.671x10^{32} 433.552M$_{Sun}$	1.053x10^{-9}	1.658x10^{15} ~T$_U$-T$_H$ HBWNI Unification T$_{HB}$↔M$_{HB}$	6.425x10^{10}	1.247x10^{68} dS, AdS	5.966x10^{49}	R$_e$/1.6048x10^{8} 1.731x10^{-23}
1.2813x 10^{-20}	1/146.5 0.0068 s*	8.834x10^{9} H	2.047x10^{6} dS, AdS	2.1773x10^{6}	8.818x10^{32} 440.903M$_{Sun}$	1.036x10^{-9}	1.715x10^{15} Unification T-Instanton	6.470x10^{10}	1.305x10^{68} dS, AdS	6.344x10^{49}	R$_e$/1.6785x10^{8} 1.655x10^{-23}
1.2322x 10^{-20}	1/152.4 0.00656 s*	9.009x10^{9} H	1.9687x10^{6} dS, AdS	2.2095x10^{6}	8.9485x10^{32} 447.424M$_{Sun}$	1.020x10^{-9}	1.766x10^{15} ~T$_U$-T$_H$	6.509x10^{10}	1.357x10^{68} dS, AdS	6.692x10^{49}	R$_e$/(2π10^{10}/360) r$_{ps}$=1.5915x10^{-23}
3.562x 10^{-27}	1.897 x10^{-9} s*	1.676x10^{13} H	R$_{BPTU}$ 0.56902 dS, AdS	6.259x10^{8}	2.535x10^{35} 126,745M$_{Sun}$ Stellar BHW Limit	3.602x10^{-12}	T$_{ps}$=hf$_{ps}$/k 1.417x10^{20} Bosonic Plasma T-Unification	6.845x10^{11}	4.698x10^{74} dS, AdS	6.568x10^{58}	R$_e$/6.038x10^{14} 4.600x10^{-30} r$_{ps}$/3.460x10^{6}

$n_{ps}=\lambda_{ps}/R_H$ 6.259x1 0_{-49}	t_{ps} $f_{ss}=1/f_{ps}$ 3.33x 10_{-31} s*	$1.264x10^{24}$ H	$\lambda_{ps}=2\pi r_{ps}$ 10_{-22} dS, AdS	$9.007x10^{16}$ $\sim c_2\|_{mod}$ $r_{ps}.r_{ss}=\lambda_{ps}/\lambda_{ps}$ =1	3.648x 10^{43} 1.824x 10^{13} M_{Sun} 2.011x 10_{-8} M_o 5.660x 10^{39} M_{hyper}	2.503x1 0_{-20} $M_o\rightarrow$ 5.035x1 0_{-28} $M_H\rightarrow$ 1.411x1 0_{-29}	$T_{\Lambda o}=hf_{ps}/k$ 2.9351x 10^{36} Instanton False Higgs T-Vacuum	$1.715x10^{15}$ HB-WNI T-Unification	2.671x1 0_{96} dS, AdS	5.360x 10^{88}	$R_e/3.436$ $x10^{36}$ 8.084x1 0_{-52} $r_{ps}/1.969$ $x10^{28}$

The Ylemic Gluon-Quark-Plasma Protostars of Universe as Vortex Energies

The stability of stars is a function of the equilibrium condition, which balances the inward pull of gravity with the outward pressure of the thermodynamic energy or enthalpy of the star (H=PV+U). The Jeans Mass M_J and the Jeans Length R_J a used to describe the stability conditions for collapsing molecular hydrogen clouds to form stars say, are well known in the scientific data base, say in formulations such as:

$M_J=3kTR/2Gm$ for a Jeans Length of $R_J=\sqrt{\{15kT/(4\pi\rho Gm)\}}=R_J=\sqrt{(kT/Gnm^2)}$.

Now the Ideal Gas Law of basic thermodynamics states that the internal pressure P and Volume of such an ideal gas are given by PV=nRT=NkT for n moles of substance being the Number N of molecules (say) divided by Avogadro's Constant L in n=N/L .

Since the Ideal Gas Constant R divided by Avogadro's Constant L and defines Boltzmann's Constant k=R/L. Now the statistical analysis of kinetic energy KE of particles in motion in a gas (say) gives a root-mean-square velocity (rms) and the familiar $2.KE=mv^2(rms)$ from the distribution of individual velocities v in such a system.

It is found that PV=(2/3)N.KE as a total system described by the v(rms). Now set the KE equal to the Gravitational PE=GMm/R for a spherical gas cloud and you get the Jeans Mass. (3/2N).(NkT)=GMm/R with m the mass of a nucleon or Hydrogen atom and $M=M_J=3kTR/2Gm$ as stated.

The Jeans' Length is the critical radius of a cloud (typically a cloud of interstellar dust) where thermal energy, which causes the cloud to expand, is counter acted by gravity, which causes the cloud to collapse. It is named after the British astronomer Sir James Jeans, who first derived the quantity; where k is Boltzmann Constant, T is the temperature of the cloud, r is the radius of the cloud, μ is the mass per particle in the cloud, G is the Gravitational Constant and ρ is the cloud's mass density (i.e. the cloud's mass divided by the cloud's volume).

Now following the Big Bang, there were of course no gas clouds in the early expanding universe and the Jeans formulations are not applicable to the mass seedling M_o; in the manner of the Jeans formulations as given.

However, the universe's dynamics is in the form of the expansion parameter of GR and so the $R(n)=R_{max}(n/(n+1))$ scale factor of Quantum Relativity.

So we can certainly analyze this expansion in the form of the Jeans Radius of the first protostars, which so obey the equilibrium conditions and equations of state of the much later gas clouds, for which the Jeans formulations then apply on a say molecular level. This analysis so defines the ylemic neutron stars as 'Gamow proto-stars' and the first stars in the cosmogenesis and the universe.

Let the thermal internal energy or ITE=H be the outward pressure in equilibrium with the gravitational potential energy of GPE=Ω. The nuclear density in terms of the super brane parameters is $\rho_{critical}=m_c/V_{critical}$ with m_c a base-nucleon mass for an 'ylemic neutron'.

$V_{critical}= 4\pi R_e^3/3$ or the volume for the ylemic neutron as given by the classical electron radius $R_e=10_{10}\lambda_{wormhole}/360=e^*/2c_2$.

$H=(\text{molarity})kT$ for molar volume as $N=(R/R_e)^3$ for $dH=3kTR^2/R_e^3$. $\Omega(R)= -\int G_oMdm/R = \{3G_om_c^2/(R_e^3)^2\}\int R^4dR = -3G_om_c^2R^5/R_e^6$ for $dm/dR=d(\rho V)/dR=4\pi\rho R^2$ and for $\rho=3m_c/4\pi R_e^3$

For equilibrium, the requirement is that $dH=d\Omega$ in the minimum condition $dH+d\Omega=0$.

This gives $dH+d\Omega=3kTR^2/R_e^3 - 16G_o\pi^2\rho^2R^4/3=0$ and the ylemic radius as:

$$\mathbf{R_{ylem}=\sqrt{\{kTR_e/G_om_{c2}\}}}$$

as the Jeans-Length precursor or progenitor for subsequent stellar and galactic generation.

The ylemic (Jeans) radii are all independent of the mass of the star as a function of its nuclear generated temperature.

Applied to the proto-stars of the vortex neutron matter or ylem, the radii are all neutron star radii and define a specific range of radii for the gravitational collapse of the electron degenerate matter.

These spans from the 'First Three Minutes' scenario of the cosmogenesis to 1.1 million seconds (or about 13 days) and encompasses the standard beta decay of the neutron, underpinning radioactivity.

The upper limit defines a trillion-degree temperature and a radius of over 40 km; the trivial Schwarzschild solution gives a typical ylem radius of so 7.4 kilometers and the lower limit defines the 'mysterious' planetesimal limit as 1.8 km.

Evolution

For long a cosmological conundrum, it could not be modelled just how the molecular and electromagnetic forces applicable to conglomerate matter distributions (say gaseous hydrogen as cosmic dust) on the quantum scale of molecules could become strong enough to form say 1 km mass concentrations, required for 'ordinary' gravity to assume control.

The ylem radii's lower limit is defined in this cosmology then show, that it is the ylemic temperature of the 1.2 billion degrees K, which perform the trick under the Ylem-Jeans formulation, and which then is applied to the normal collapse of hydrogenic atoms in summation.

The stellar evolution from the ylemic (di-neutronic) templates is well established in QR and confirms most of the Standard Model's ideas of nucleosynthesis and the general Temperature cosmology.

The standard model is correct in the temperature assignment but is amiss in the corresponding 'size-scales' for the cosmic expansion.

The Big Bang cosmogenesis describes the universe as a Planck-Black Body Radiator, which sets the Cosmic-Microwave-Black Body Background Radiation Spectrum (CMBBR) as a function of n as $T^4=18.2(n+1)^2/n^3$ and derived from the Stefan-Boltzmann-Law and the related statistical frequency distributions.

We have the GR metric for Schwarzschild-Black Hole Evolution as $R_S=2GM/c^2$ as a function of the star's Black Hole's mass M and we have the ylemic Radius as a function of temperature only as $R_{ylem}\sqrt{(kT.R_{e3}/G_om_{c2})}$.

The nucleonic mass-seed $m_c=m_P.Alpha^9$ and the product $G_om_c^2$ is a constant in the partitioned nevolution of $m_c(n)=Y^n.m_c$ and $G(n)=G_o.X^n$.

Identifying the ylemic Radius with the Schwarzschild Radius then indicates a specific mass a specific temperature and a specific radius.

Those we call the Chandrasekhar Parameters: $M_{Chandra}$=1.5 solar Masses=$3x10^{30}$ kg and $R_{Chandra}=2G_oM_{Chandra}/c^2$ or 7407.40704...meters, which is the typical neutron star radius inferred today.

$T_{Chandra}=R_{Chandra}^2.G_om_c^2/kR_e^3$ =$1.985x10^{10}$ K for Electron Radius R_e and Boltzmann's Constant k.

Those Chandrasekhar parameters then define a typical neutron star with a uniform temperature of 20 billion K at the white dwarf limit of ordinary stellar nucleosynthetic evolution (Hertzsprung-Russell or HR-diagram).

The Radius for the mass parametric Universe is given in $R(n)=R_{max}(1-n/(n+1))$ correlating the ylemic temperatures as the 'uniform' CMBBR-background and we can follow the evolution of the ylemic radius via the approximation:

$R_{ylem}=0.05258...\sqrt{T}=(0.0753).[(n+1)^2/n^3]^{[1/8]}$

$R_{ylem}(n_{present}=1.132711...)=0.0868...$ m* for a $T_{ylem}(n_{present})=2.747$ K* for the present time $t_{present}=n_{present}/H_o$.

What then is $n_{Chandra}$?

This would describe the size of the universe as the uniform temperature CMBBR today manifesting as the largest stars, mapped however onto the ylemic neutron star evolution as the protostars (say as $n_{Chandra}'$), defined not in manifested mass, say as neutron conglomerations, but as a quark-gluon plasma, manifesting physically from the quantum geometric templates in the UFOQR in association with the Vortex-Potential-Energy or VPE.

$R(n_{Chandra}')=R_{max}(n_{Chandra}'/(n_{Chandra}'+1))=7407.40741...$ for $n_{Chandra}'=4.64\text{x}10^{-23}$ and so a time of $t_{Chandra}'=n_{Chandra}'/H_o=n_{Chandra}'/1.88\text{x}10^{-18}=2.47\text{x}10^{-5}$ seconds.

QR defines the Weyl-Temperature limit for Bosonic Unification as 1.9 nanoseconds at a temperature of $1.42\text{x}10^{20}$ Kelvin and the weak-electromagnetic unification at 1/140 seconds or 7 microseconds at $T=1.66\text{x}10^{15}$ K.

So we place the first ylemic proto-star after the bosonic unification, before which the plenum had been defined as undifferentiated 'bosonic plasma', and after the electro-weak unification, which defined the Higgs-Bosonic Restmass induction via the weak interaction vector-bosons to enable the di-neutrons to be born as ylem or Gamow's neutron matter.

287 seconds after the Instanton, the universe was so 173 Million km across, when its ylemic 'concentrated' VPE-Temperature was so 583.5 Billion K* and contained in the limiting quarkgluon-plasma star of 80.3 km in diameter.

The 'pixelated' universe so became scaled in ylemic temperature bubbles in the form of primordial White-Hole-Sources coupled to Black Hole-Sinks in a form of macro quanta to reflect the sourcesink Eps coupled to the sinksource Ess of the underpinning elementary super membrane Eps.Ess.

As the universe continued its expansion, the WH-BH dyads remained as temperature hotspots embedded within the cooling spacetime as the Black Body Radiator of the cosmogenesis.

It so had been the thermodynamic temperature of the expanding universe, which had differentiated the space time matrix in scale and beginning with an $80.3/173\text{x}10^6$ or 1 to 2.15 Million ratios between the Vortex-PE and its encompassing spacetime envelope.

As the universe expanded and cooled, the first ylem stars crystallized from the mass seedling M_o. The universe's expansion however cooled the CMBBR background and we to calculate the scale of the universe corresponding to this ylemic scenario; we simply calculate the 'size' for the universe at $T_{Chandra}=20$ Billion K for $T_{Chandra}^4$ and we then find $n_{Chandra}=4.89\text{x}10^{-14}$ and $t_{Chandra}=26{,}065$ seconds or so 7.24 hours.

The Radius $R(n_{Chandra})=7.81x10^{12}$ meters or 7.24 light hours. This is about 52 Astronomical Units and an indicator for the largest possible star in terms of radial extent and the 'size' of a typical solar system, encompassed by supergiants on the HR-diagram.

We so know that the ylemic temperature decreases in direct proportion to the square of the ylemic radius and one hitherto enigmatic aspect in cosmology relates to this in the planetesimal limit. Briefly, a temperature of so 1.2 billion degrees defines an ylemic radius of 1.8 km as the dineutronic limit for proto-neutron stars contracting from so 80 km down to this size just 1.1 million seconds or so 13 days after the Big Bang.

This then 'explains' why chunks of matter can conglomerate via molecular and other adhesive interactions towards this size, where then the accepted gravity is strong enough to build planets and moons. It works, because the ylemic template is defined in subatomic parameters reflecting the mesonic inner and leptonic outer ring boundaries, the planetesimal limit being the leptonic mapping. So neutrino- and quark blueprints micro-macro dance their basic definition as the holographic projections of the space-time quanta.

Now because the Electron Radius is directly proportional to the linearized wormhole perimeter and then the Compton Radius via Alpha in $R_e=10^{10}\lambda_{wormhole}/360=e^*/2c^2=Alpha.R_{Compton}$, the Chandrasekhar White Dwarf limit is proportional to the protonic diameter mirrored in the classical electron radius in $R_{proton} = ½XR_e = 0.85838052x10^{-15}$ m* as a reduced classical electron radius and for Øproton = $XR_e = 1.71676x10^{-15}$ m* quantum geometrically increasing $M_{chandra}$ in Y=1/X as $Y.M_{chandra} = 4.854102x10^{30}$ kg* or 2.4271 M_{Sun}. The White Dwarf Chandrasekhar limit so increases to the Tolman-Oppenheimer-Volkoff (TOV) limit $M_{chandra}Y = R_{TOV}c^2/'2G_o$.

Hence any star experiencing electron degeneracy is actually becoming ylemic or dineutronic, the boundary for this process being the Chandrasekhar mass, extended to the TOV mass.

As this represents the Electron Radius as a Protonic Diameter, the Protonic Radius must then indicate the limit for the scale where proton degeneracy would have to enter the scenario. As the proton cannot degenerate in that way, the neutron star must enter its Quark-Star Gluon-Plasma phase transition at the $½R_e/Y$ scale, corresponding to a mass of $2Y.M_{Chandra}=9.7082x10^{30}$ kg* or 4.854 solar masses. This marker is between the F-googol and the G-googol space quanta counter nexus coordinates.

The maximum ylemic radius limiting the manifestation of a Quark star then is found from the constant density proportion ρ=M/V:

$(R_{ylemmax}/R_e)_3=M_{Chandra}/m_c$ for $R_{ylemmax}=40.16235$ km.

The corresponding ylemic temperature is 583.5 Billion K for a CMBBR-time of 287 seconds or so 4.8 minutes from a $n=5.4x10^{-16}$, when the universe had a diameter of so 173 Million km.

The first ylemic protostar vortex was at that time manifested as the ancestor for all neutron star generations to follow.

This vortex is described in a cosmic string encircling a spherical region so 80.32 km across and within a greater universe of diameter 173 Million km and at a thermodynamic temperature of 583.5 Billion Kelvin at that point in the cosmogenesis.

This vortex manifested as a VPE concentration after the expanding universe had cooled to allow the universe to become transparent from its hitherto defining state of opaqueness and a time known as the decoupling of matter (in the form of the M_o seedling partitioned in m_c's) from the radiation pressure of the CMBBR bosons.

And so it continued!