Konstantenwerte

c in m/s
Yearsecs in Sekunden
rho in kg/m^3
G: Gravitationskonstante N*m^2*kg^-2
=m^3*s^-2*kg^-1

```
c = 299792458;
VarMia = 1000000000;
Yearsecs = (365 + (1 / 4)) * 60 * 60 * 24;
G = 667259 * 10^-16;
timeMax = Yearsecs * 1000000000 * 19 ;
rho = 552 * 10^-29;
MParsec = 1000000 * 30857 * 10^12;
H = 66262 * 10^-38;
CBRWavelength = 168 * 10^-5;
Referenzwellenlaenge = 1216 * 10^-10;
ReferenzFrequenz = c / Referenzwellenlaenge;
ReferenzPhotonenEnergie = (c / Referenzwellenlaenge) * H;
PiWen =
 3.14159265358979323846264338327950288419716939937510582097494459230781640628620899862803482534211706798214
  33446128475648233786783165271201909145648566923460348610454326648213393607260249141273724587006606315588l
  38193261179310511854807446237996274956735188575272489122793818301194912983367336244065664308602139494639 5
  71787214684409012249534301465495853710507922796892589235420199561121290219608640344181598136297747713099 6
  37838752886587533208381420617177669147303598253490428755468731159562863882353787593751957781857780532171 2
  41389124972177528347913151557485724245415069595082953311686172785588907509838175463746493931925506040092 7
  42590694912933136770289891521047521620569660240580381501935112533824300355876402474964732639141992726042 6
  65344987202755960236480665499119881834797753566369807426542527862551818417574672890977727938000816470600
  56948556209921922218427255025425688767179049460165346680498862723279178608578438382796797668145410095388 3
  09563643719172874677646575739624138908658326459958133904780275900994657640789512694683983525957098258226 2
  15709858387410597885959772975498930161753928468138268683868942774155991855925245953959431049972524680845 9
  40635342207222582848864815845602850601684273945226746767889525213852254995466672782398645659611635488623 0
  09208747609178249385890097149096759852613655497818931297848216829989487226588048575640142704775551323796 4
  79934403742007310578539062198387447808478489683321445713868751943506430218453191048481005370614680674919 2
```

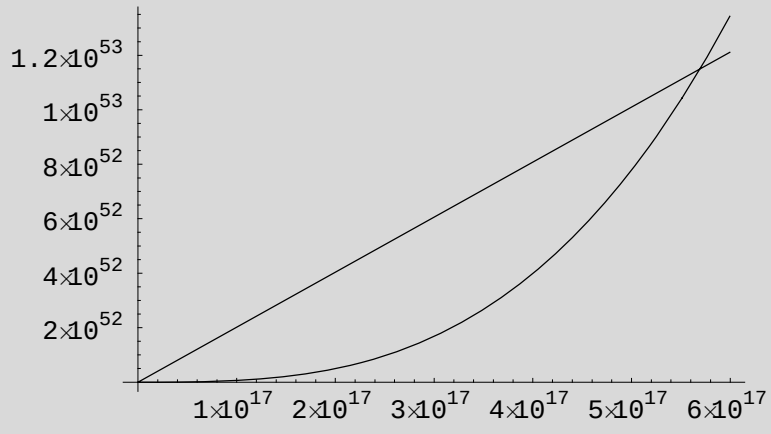
```
  0951465502252316038819301420937621378559566389377870830390697920773467221825625996615014215030680384477347
  4736384052571459102897064140110971206280439039759515677157700420337869936007230558763176359421873125147127
  8352093539657251210835791513698820914442100675103346711031412671113699086585163983150197016515116851714377
  8594616371802709819943099244889575712828905923233260972997120844335732654893823911932597463667305836041427
  5963766983895228684783123552658213144957685726243344189303968642624341077322697802807318915441101044682327
  5987648611791045334885034611365768675324944166803962657978771855608455296541266540853061434443185867697517
  0634328587856983052358089330657574067954571637752542021149557615814002501262285941302164715509792592309907
  2978285647503203198691514028708085990480109412147221317947647772622414254854540332157185306142288137585047
  0918076383271664162748888007869256029022847210403172118608204190004229661711963779213375751149595015660497
  2599397805419341447377441842631298608099888687413260472156951623965864573021631598193195167353812974167727
  8379862300159377647165122893578601588161755782973523344604281512627203734314653197777416031990665541876397
  8049092636019759882816133231666365286193266863360627356763035447762803504507772355471058959487027908143567
  9130771098704085913374641442822772634659470474587847787201927715280731767907707157213444730605700733492437
  5865865570552690496520985803385072242648293972858478316305777756068887644624824685792603953527734803048027
N[ReferenzFrequenz, 5] "Hz, ReferenzFrequenz"
N[ReferenzPhotonenEnergie, 5] "J, ReferenzPhotonenEnergie"
```

2.4654×10^{15} Hz, ReferenzFrequenz

1.6336×10^{-18} J, ReferenzPhotonenEnergie

Schnittpunkt der Funktionen Masse/LBH-Limit

```
Plot[{(1 / 2) * (c^3) * t / G, 4 / 3 * PiWen * (t * c)^3 * rho}, {t, 0, timeMax}];
```




```
LBHHorizon = (3 / (8 * G * PiWen * rho))^(1 / 2); N[LBHHorizon, 6] "Sec "
```

5.69277×10^{17} Sec

```
MiaLYAge = LBHHorizon / (1000000000 * Yearsecs); N[MiaLYAge, 4] Mia. LY
```

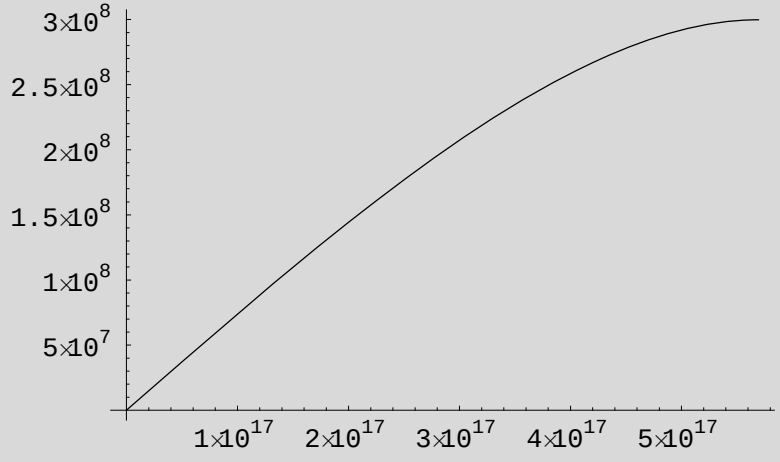
18.04 Mia.LY

```
LBHMasse = (4 / 3) * PiWen * (LBHHorizon * c)^3 * rho; N[LBHMasse, 6] kg
```

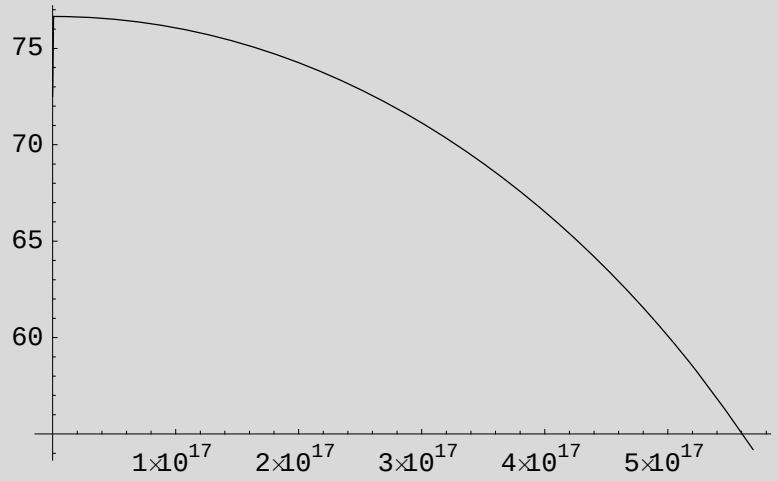
1.14937×10^{53} kg

```
DeltaE := 1 - ((((1 / 2) * (c^3) * t / G) - ((4 / 3) * PiWen * (t * c)^3 * rho)) / ((1 / 2) * (c^3) * t / G))
```

```
vRedShift := ((c^2) * (1 - ((ReferenzPhotonenEnergie - ReferenzPhotonenEnergie * DeltaE) /
          ReferenzPhotonenEnergie)^2))^(1 / 2);
Plot[vRedShift, {t, 0, LBHHorizon}];
```



```
HubbleWert := (vRedShift / 1000) / ((t * c) / MParsec) ;
Plot[HubbleWert, {t, 0, LBHHorizon}];
N[((((c^2) * (1 - ((ReferenzPhotonenEnergie - ReferenzPhotonenEnergie * (
                1 - ((((1 / 2) * (c^3) * ((3 / (8 * G * PiWen * rho))^(1 / 2)) / G) -
                     ((4 / 3) * PiWen * (((3 / (8 * G * PiWen * rho))^(1 / 2)) * c)^3 * rho)) / ((1 / 2) * (c^3) *
                     ((3 / (8 * G * PiWen * rho))^(1 / 2)) / G)))) / ReferenzPhotonenEnergie)^2))^(1 / 2)) /
   ((1000 * ((3 / (8 * G * PiWen * rho))^(1 / 2)) * 299792458) / (1000000 * 30857 * 10^12))), 4]
" km/h/MpSec am LBH-Horizont"
N[((((c^2) * (1 - ((ReferenzPhotonenEnergie - ReferenzPhotonenEnergie * (
                 1 - ((((1 / 2) * (c^3) * (1) / G) - ((4 / 3) * PiWen * ((1) * c)^3 * rho)) /
                    ((1 / 2) * (c^3) * (1) / G)))) / ReferenzPhotonenEnergie)^2))^(1 / 2)) /
    ((1000 * (1) * 299792458) / (1000000 * 30857 * 10^12))), 4] " km/h/MpSec nach 1 m"
```



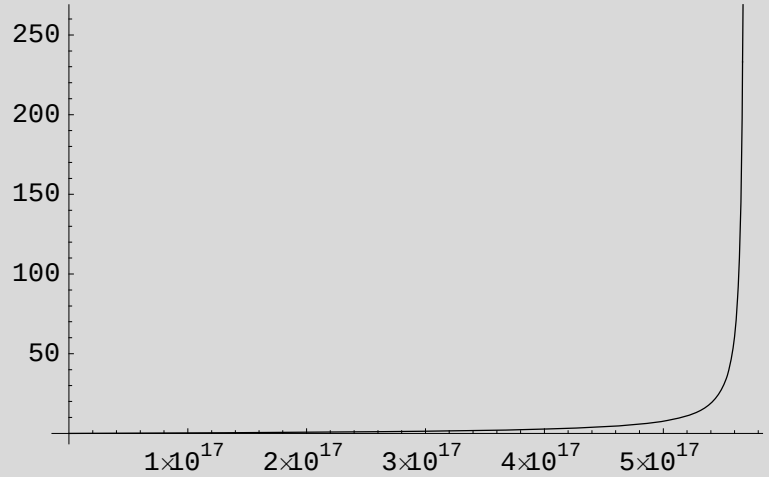
Out[214]= 54.20 km/h/MpSec am LBH-Horizont

Out[215]= 76.66 km/h/MpSec nach 1 m

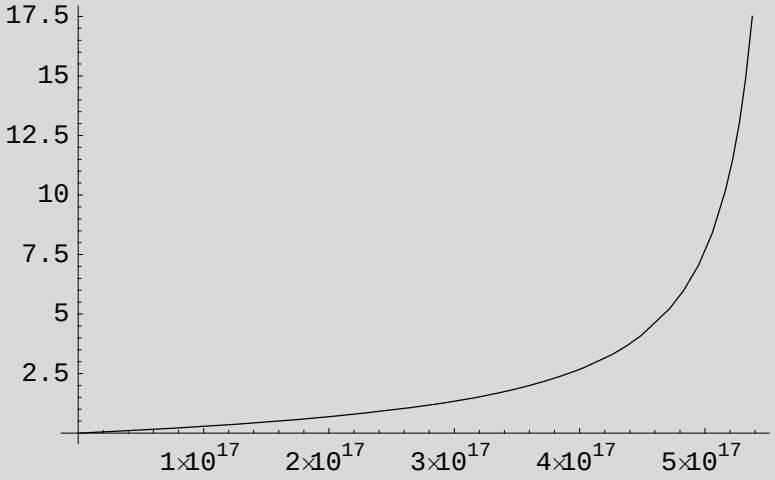
Redshift:

```
FreqvRedShift := ReferenzFrequenz * (((c - vRedShift) / (c + vRedShift))^(1 / 2));
WellenlangevRedShift := c / FreqvRedShift;
ZvRedShift := (WellenlangevRedShift - Referenzwellenlaenge) / Referenzwellenlaenge;
Plot[ZvRedShift, {t, 0, LBHHorizon}];
```

General::spell1 : Possible spelling error: new symbol name "ZvRedShift" is similar to existing symbol "vRedShift". More…

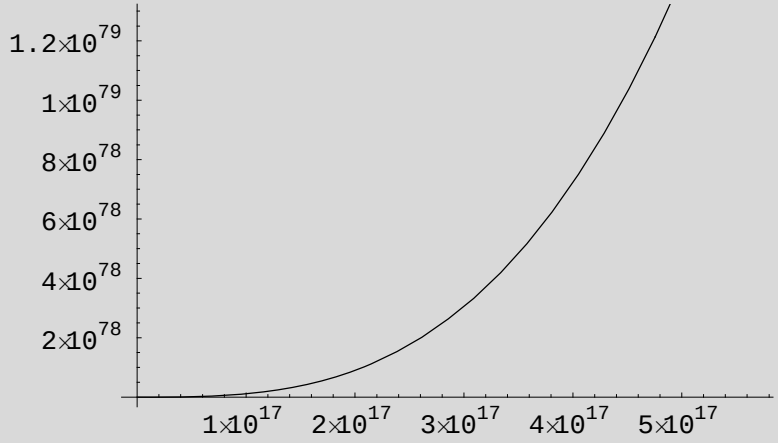



```
Plot[ZvRedShift, {t, 0, LBHHorizon - Yearsecs * 1000000000}];
```



LBHVolumeSpeed= Volume per second.
Licht bereitet sich aus und das Volumen, welches dadurch aufgespannt wird, verändert sich mit ... LichtVolumenGeschwindigkeit:

```
LBHVolume := (4 / 3) * PiWen * (t * c)^3;
Plot[LBHVolume, {t, 0, LBHHorizon}];
N[(4 / 3) * PiWen * (LBHHorizon * c)^3, 5] " Kubikmeter LBHVolume am LBH-Horizont"
```



2.0822×10^{79} Kubikmeter LBHVolume am LBH-Horizont

```
LBHRadius = LBHHorizon * c;
```

```
NothingDistance = (3 * ((((1 / 2) * (c^2)) / G) - (1 - (((c - c * (((c / CBRWavelength) / ((c^3 / (16 * PiWen * G)) /
                          (4 / 3 * PiWen * ((((3 / (8 * rho * PiWen * G))^(1 / 2)) * c)^3) * rho)))^2)) /
                  (1 + (((c / CBRWavelength) / ((c^3 / (16 * PiWen * G)) / (4 / 3 * PiWen *
                          ((((3 / (8 * rho * PiWen * G))^(1 / 2)) * c)^3) * rho)))^2)))^2) / c^2)^(1 / 2) *
        (((1 / 2) * (c^2)) / G)) / (4 * PiWen * rho))^(1 / 2) - G *
    ((2 * (4 / 3 * PiWen * ((((3 / (8 * rho * PiWen * G))^(1 / 2)) * c)^3) * rho)) / (c^2));
```

```
LBHMissingVolume = (4 / 3) * PiWen * (LBHHorizon * c)^3 - (4 / 3) * PiWen * ((LBHHorizon * c + NothingDistance))^3;
LBHMissingMass = LBHMissingVolume * rho ;
LBHInnerSurface := PiWen * (LBHHorizon * c + NothingDistance)^2;
NothingDistanceCubeVol = (-NothingDistance)^3;
NothingDistanceSphereVol = (4 / 3) * Pi * ((-NothingDistance / 2))^3;
N[LBHRadius, 4] " m LBH-Radius"
N[-NothingDistance, 4] " m NothingDistance-Wert := Distanz der Überlappung der LBH am einem TouchPoint"
N[-NothingDistance / c, 4] " Sec NothingDistance-ZeitWert := Zeit der Überlappung der LBH am einem TouchPoint"
N[LBHMissingVolume, 8] " LBHMissingVolume-Wert"
N[(4 / 3) * PiWen * (LBHHorizon * c)^3, 5] " Kubikmeter LBHVolume am LBH-Horizont"
LBHTotalMass = rho * (4 / 3) * PiWen * (LBHHorizon * c)^3 ;
N[LBHTotalMass, 5] " LBHTotalMass "
Null
```

1.707×10^{26} m LBH-Radius

0.00006685 m NothingDistance-Wert := Distanz der Überlappung der LBH am einem TouchPoint

2.230×10^{-13} Sec NothingDistance-ZeitWert := Zeit der Überlappung der LBH am einem TouchPoint

2.4466315×10^{49} LBHMissingVolume-Wert

2.0822×10^{79} Kubikmeter LBHVolume am LBH-Horizont

1.1494×10^{53} LBHTotalMass