```
In[15]:= ClearAll["Global`*"]

In[16]:= a[t_] = Exp[t];

In[17]:= doffactor[d_] = (d (d - 3))/2 + (d - 2); (*factor related to the degrees of freedom*)
myH1[x_, d_, t_] = HankelH1[(d - 1)/2, x a[t]^-1];
myHP1[x_, d_, t_] = D[myH1[x, d, t], t];
myH2[x_, d_, t_] = HankelH2[(d - 1)/2, x a[t]^-1];
myHP2[x_, d_, t_] = D[myH2[x, d, t], t];
myBeta[x_, d_, t_] =
  -I ((Pi/(8 x)) ^ (1/2)) a[t]^-((d - 1)/2) Exp[I x] (myHP2[x, d, t] + (-I x - (d - 1)/2) myH2[x, d, t]);
myBetastar[x_, d_, t_] = I ((Pi/(8 x)) ^ (1/2)) a[t]^-((d - 1)/2) Exp[-I x]
   (myHP1[x, d, t] + (I x - (d - 1)/2) myH1[x, d, t]);
myBetasqr[x_, d_, t_] = Re[(myBeta[x, d, t]) (myBetastar[x, d, t])];
NumberDensity[x_, d_, t_] = myBetasqr[x, d, t]/((2 Pi) ^ (d - 1));
BE[x_] = 1/(Exp[x] - 1);
intfactor[x_, d_] = (2 ((Pi) ^ ((d - 1)/2)))/Gamma[(d - 1)/2] (x ^ (d - 2));
(*factor related to the integration in d dimension*)
EnergyDensity[d_, t_] =
  NIntegrate[x (NumberDensity[x, d, t]) (BE[x]) (intfactor[x, d]), {x, 0, Infinity}];
```

NIntegrate::inumr : The integrand

$\left(2^{-1-d}\,\pi^{2+\frac{1}{2}(-1+d)-d}\,x^{-1+d}\,\mathrm{Re}\left[1/x\left(e^{t}\right)^{1-d}\left(\ll 1\gg\right)\left(-\frac{1}{2}\,e^{-t}\,x\left(\mathrm{HankelH2}[\mathrm{Plus}[\ll 2\gg],\,\mathrm{Times}[\ll 2\gg]]-\mathrm{HankelH2}[\ll 2\gg]\right)+\left(\frac{1}{2}\,\mathrm{Plus}[\ll 2\gg]-i\,x\right)\mathrm{HankelH2}\left[\frac{1}{2}\,\mathrm{Plus}[\ll 2\gg],\,\mathrm{Power}[\ll 2\gg]\,x\right]\right)\right]\right)\Big/\left(\left(-1+e^{x}\right)\mathrm{Gamma}\left[\frac{1}{2}(-1+d)\right]\right)$ has evaluated to

non-numerical values for all sampling points in the region with boundaries $\{\{\infty, 0.\}\}$. ≫

NIntegrate::inumr : The integrand

$\left(2^{-1-d}\,\pi^{2+\frac{1}{2}(-1+d)-d}\,x^{-1+d}\,\mathrm{Re}\left[1/x\left(e^{t}\right)^{1-d}\left(\ll 1\gg\right)\left(-\frac{1}{2}\,e^{-t}\,x\left(\mathrm{HankelH2}[\mathrm{Plus}[\ll 2\gg],\,\mathrm{Times}[\ll 2\gg]]-\mathrm{HankelH2}[\ll 2\gg]\right)+\left(\frac{1}{2}\,\mathrm{Plus}[\ll 2\gg]-i\,x\right)\mathrm{HankelH2}\left[\frac{1}{2}\,\mathrm{Plus}[\ll 2\gg],\,\mathrm{Power}[\ll 2\gg]\,x\right]\right)\right]\right)\Big/\left(\left(-1+e^{x}\right)\mathrm{Gamma}\left[\frac{1}{2}(-1+d)\right]\right)$ has evaluated to

non-numerical values for all sampling points in the region with boundaries $\{\{\infty, 0.\}\}$. ≫

```
In[29]:= Plot[{(doffactor[3]) (EnergyDensity[3, t]), (doffactor[4]) (EnergyDensity[4, t]),
  (doffactor[5]) (EnergyDensity[5, t]), (doffactor[6]) (EnergyDensity[6, t])}, {t, 0, 10},
 PlotRange → {0, 0.354}, AxesLabel → {"t", "Energy Density"}, PlotLabel → "Energy Density vs Time"]
```

Out[29]=