In[5]:=
```
nlnDust35 = (v1^β) * (h * ((v1 * 1 000 000 000)^4) / ((300 000 000)^2)) /
    (Exp[h * v1 * 1 000 000 000 / (k * Td)] - 1)
```

Out[5]=
$$\frac{100\,000\,000\,000\,000\,000\,000\,000\ h\ v1^{4+\beta}}{9\left(-1+e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Td}}\right)}$$

In[7]:=
```
XX35 = h * v1 * 1 000 000 000 / (k * Tcmb)
```

Out[7]=
$$\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}$$

In[8]:=
```
nlnCMB35 = (h * ((v1 * 1 000 000 000)^4) / ((300 000 000)^2)) *
   XX35 * Exp[XX35] / (Tcmb * ((Exp[XX35] - 1)^2))
```

Out[8]=
$$\frac{100\,000\,000\,000\,000\,000\,000\,000\,000\,000\ e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\ h^2\ v1^5}{9\left(-1+e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\right)^2\ k\ Tcmb^2}$$

In[9]:=
```
nlnDust150 = (v0^β) * (h * ((v0 * 1 000 000 000)^4) / ((300 000 000)^2)) /
    (Exp[h * v0 * 1 000 000 000 / (k * Td)] - 1)
```

Out[9]=
$$\frac{100\,000\,000\,000\,000\,000\,000\,000\ h\ v0^{4+\beta}}{9\left(-1+e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Td}}\right)}$$

In[10]:=
```
XX150 = h * v0 * 1 000 000 000 / (k * Tcmb)
```

Out[10]=
$$\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}$$

In[11]:=
```
nlnCMB150 = (h * ((v0 * 1 000 000 000)^4) / ((300 000 000)^2)) *
   XX150 * Exp[XX150] / (Tcmb * ((Exp[XX150] - 1)^2))
```

Out[11]=
$$\frac{100\,000\,000\,000\,000\,000\,000\,000\,000\,000\ e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}}\ h^2\ v0^5}{9\left(-1+e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}}\right)^2\ k\ Tcmb^2}$$

In[12]:=
```
(nlnDust150 / nlnCMB150) / (nlnDust35 / nlnCMB35)
```

Out[12]=
$$\left(e^{-\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}+\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\left(-1+e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}}\right)^2\left(-1+e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Td}}\right)\ v0^{-1+\beta}\ v1^{1-\beta}\right)\Big/$$
$$\left(\left(-1+e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Td}}\right)\left(-1+e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\right)^2\right)$$

In[19]:=
```
D36 = h * v1 * 1 000 000 000 / (k * Tcmb)
```

Out[19]=
$$\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}$$

In[20]:=
```
NEDT35 = 100 * (D36 * Exp[D36] / (Tcmb * (Exp[D36] - 1)^2)) *
   (Exp[h * 1 000 000 000 * v1 / (k * Td)] - 1) / ((v1 / v0)^β)
```

Out[20]=
$$\frac{100\,000\,000\,000\ e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\left(-1+e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Td}}\right)\ h\ v1\left(\frac{v1}{v0}\right)^{-\beta}}{\left(-1+e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\right)^2\ k\ Tcmb^2}$$

In[21]:=
```
D150 = h * v0 * 1 000 000 000 / (k * Tcmb)
```

Out[21]=
$$\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}$$

In[22]:=
```
NEDT150 = 100 * (D150 * Exp[D150] / (Tcmb * (Exp[D150] - 1) ^ 2)) *
   (Exp[h * 1 000 000 000 * v0 / (k * Td)] - 1) / ((v0 / v0) ^ β)
```

Out[22]=
$$\frac{100\,000\,000\,000\ e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}} \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Td}}\right) h\ v0}{\left(-1 + e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}}\right)^2 k\ Tcmb^2}$$

In[23]:=
```
NEDT35 / NEDT150
```

Out[23]=
$$\frac{e^{-\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}+\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}} \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}}\right)^2 \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Td}}\right) v1 \left(\frac{v1}{v0}\right)^{-\beta}}{\left(-1 + e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Td}}\right) \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\right)^2 v0}$$

In[24]:=
```
NEDustfpSPUD =
  NETbolo / Sqrt[2 * pixel] * (nlnDust150 / nlnCMB150) / (nlnDust35 / nlnCMB35)
```

Out[24]=
$$\frac{e^{-\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}+\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}} \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}}\right)^2 \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Td}}\right) NETbolo\ v0^{-1+\beta}\ v1^{1-\beta}}{\sqrt{2}\ \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Td}}\right) \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\right)^2 \sqrt{pixel}}$$

In[25]:=
```
NEDustfpMIDEX = NETbolo / Sqrt[det] * (NEDT35 / NEDT150)
```

Out[25]=
$$\frac{e^{-\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}+\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}} \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Tcmb}}\right)^2 \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Td}}\right) NETbolo\ v1 \left(\frac{v1}{v0}\right)^{-\beta}}{\sqrt{det}\ \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v0}{k\ Td}}\right) \left(-1 + e^{\frac{1\,000\,000\,000\ h\ v1}{k\ Tcmb}}\right)^2 v0}$$