In[823]:=
```
Block[{A0, A1, A2, A3, Abtm, Atop, Aτ,
  M1, M2, κ0, κ1, κ2, κ3, σS, MD, ME, ML, MN, MQ, MU, Rsc},
 $MinPrecision = prec;
 A0 = SetPrecision[TeV, prec];
 A1[i_] := SetPrecision[TeV, prec];
 A2 = SetPrecision[TeV, prec];
 A3 = -SetPrecision[1 TeV, prec];
 Aτ = SetPrecision[TeV, prec];
 Abtm = SetPrecision[TeV, prec];
 Atop = SetPrecision[TeV, prec];
 κ0 = SetPrecision[0.4, prec];
 κ1[i_] := SetPrecision[10^-6, prec];
 κ2 = SetPrecision[0.5, prec];
 κ3 = SetPrecision[0.75, prec];
 M1 = SetPrecision[350 GeV, prec];
 M2 = SetPrecision[500 GeV, prec];
 σS = SetPrecision[TeV, prec];
 MD[3, 3] = MU[3, 3] = MQ[3, 3] = SetPrecision[TeV, prec];
 ME[3, 3] = SetPrecision[TeV, prec];
 MN[3, 3] = SetPrecision[TeV, prec];
 ML[1, 1] = ML[2, 2] = ML[3, 3] = SetPrecision[TeV, prec];
 ML[1, 2] = ML[1, 3] = ML[2, 3] = SetPrecision[500 GeV, prec];
 Rsc = SetPrecision[500 GeV, prec];
 {valSNe, vecSNe} = Eigensystem[TE3 + TE3l];
 {valSNo, vecSNo} = Eigensystem[TO3 + TO3l];
 {valSC, vecSC} = Eigensystem[TC3 + TC3l];
 valFN = Sqrt[Eigenvalues[Mnχ.Transpose[Conjugate[Mnχ]]]];
 vecFN = Inverse[Transpose[Eigenvectors[Mnχ.Transpose[Conjugate[Mnχ]]]]];
 valFC = Sqrt[Eigenvalues[Conjugate[McχT].Mcχ]];
 vecFCu = Conjugate[Inverse[Transpose[Eigenvectors[Mcχ.Conjugate[McχT]]]]];
 vecFCv = Inverse[Transpose[Eigenvectors[Conjugate[McχT].Mcχ]]];
 $MinPrecision = 0;
 {Im[{N[Sqrt[valSNe] * 10^-9, 4], N[Sqrt[valSNo] * 10^-9, 4]}]} // Chop
]
```

Out[823]=
```
{{{0, 0, 0, 0, 0, 0, 0}, {0, 0, 0, 0, 0, 0, 0}}}
```

In[824]:=
```
Chop[N[vecSNe^2, 2], 0.01] // MatrixForm
```

Out[824]//MatrixForm=

$$\begin{pmatrix} 0.99 & 0.0099 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0.026 & 0.026 & 0.026 & 0.92 \\ 0 & 0 & 0 & 0.31 & 0.31 & 0.31 & 0.078 \\ 0 & 0 & 0 & 0.67 & 0.17 & 0.17 & 0 \\ 0 & 0 & 0 & 0 & 0.50 & 0.50 & 0 \\ 0 & 0.049 & 0.95 & 0 & 0 & 0 & 0 \\ 0 & 0.94 & 0.050 & 0 & 0 & 0 & 0 \end{pmatrix}$$

In[825]:=
```
N[Sqrt[valSNe] * 10^-9, 4] // Chop
```

Out[825]=
```
{3428., 1589., 1187., 863.6, 863.6, 252.3, 124.8}
```

In[826]:=
```
Chop[N[vecSNo^2, 2], 0.01] // MatrixForm
```

Out[826]//MatrixForm=

$$\begin{pmatrix} 0.99 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0.32 & 0.32 & 0.32 & 0.039 \\ 0 & 0 & 1.0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0.50 & 0.50 & 0 \\ 0 & 0 & 0 & 0.67 & 0.17 & 0.17 & 0 \\ 0 & 0 & 0 & 0.013 & 0.013 & 0.013 & 0.96 \\ 0 & 0.99 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

In[827]:=
```
N[Sqrt[valSNo] * 10^-9, 4] // Chop
```

Out[827]=
```
{3428., 1247., 1226., 863.6, 863.6, 53.54, 0}
```

In[828]:= **Chop[N[vecSC^2, 2], 0.01] // MatrixForm**

Out[828]//MatrixForm=

$$\begin{pmatrix} 0.99 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0.33 & 0.33 & 0.33 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1.0 \\ 0 & 0 & 0.50 & 0.50 & 0 & 0 \\ 0 & 0 & 0.17 & 0.17 & 0.67 & 0 \\ 0 & 0.99 & 0 & 0 & 0 & 0 \end{pmatrix}$$

In[829]:= **N[Sqrt[valSC] * 10^-9, 4] // Chop**

Out[829]= {3428., 1226., 1001., 867.3, 867.1, 0}

In[830]:= **N[valFC * 10^-9, 4] // Chop**

Out[830]= {532.7, 373.0, 1.777, 0, 0}

In[831]:= **Chop[N[vecFN^2, 2], 0.01] // MatrixForm**

Out[831]//MatrixForm=

$$\begin{pmatrix} 0 & 0 & 0.015 & 0 & 0.98 & 0 & 0 & 0 & 0 \\ 0 & 0.81 & 0.067 & 0.11 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1.0 \\ 0 & 0 & 0.49 & 0.50 & 0 & 0 & 0 & 0 & 0 \\ 0.36 & 0.15 & 0.24 & 0.24 & 0 & 0 & 0 & 0 & 0 \\ 0.63 & 0.038 & 0.19 & 0.14 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.33 & 0.33 & 0.33 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.67 & 0.17 & 0.17 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0.50 & 0.50 & 0 \end{pmatrix}$$

In[832]:= **N[valFN * 10^-9, 4] // Chop**

Out[832]= $\{758.1, 532.3, 500.0, 406.4, 389.3, 326.7, 1.799 \times 10^{-10}, 0, 0\}$