```
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[300 GeV, 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[0.6, 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 + TE31];
 {valSNo, vecSNo} = Eigensystem[TO3 + TO31];
 {valSC, vecSC} = Eigensystem[TC3 + TC31];
 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]}],
   N[Sqrt[valSNe] * 10^-9, 4][[7]], N[valFN * 10^-9, 4][[7]]} // Chop
]
```

```
Chop[N[vecSNe^2, 2], 0.01] // MatrixForm
```

$$\begin{pmatrix} 0.99 & 0.0099 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0.028 & 0.028 & 0.028 & 0.92 \\ 0 & 0 & 0 & 0.31 & 0.31 & 0.31 & 0.083 \\ 0 & 0 & 0 & 0.67 & 0.17 & 0.17 & 0 \\ 0 & 0 & 0 & 0 & 0.50 & 0.50 & 0 \\ 0 & 0 & 1.0 & 0 & 0 & 0 & 0 \\ 0 & 0.99 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

```
N[Sqrt[valSNe] * 10^-9, 4] // Chop
```

```
{3384., 1578., 1185., 863.6, 863.6, 458.0, 131.0}
```

```
Chop[N[vecSNo^2, 2], 0.01] // MatrixForm
```

$$\begin{pmatrix} 0.99 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0.32 & 0.32 & 0.32 & 0.041 \\ 0 & 0 & 0 & 0 & 0.50 & 0.50 & 0 \\ 0 & 0 & 0 & 0.67 & 0.17 & 0.17 & 0 \\ 0 & 0 & 1.0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0.014 & 0.014 & 0.014 & 0.96 \\ 0 & 0.99 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

```
N[Sqrt[valSNo] * 10^-9, 4] // Chop
```

```
{3383., 1248., 863.6, 863.6, 672.9, 197.2, 0}
```

```
Chop[N[vecSC^2, 2], 0.01] // MatrixForm
```

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

```
N[Sqrt[valSC] * 10^-9, 4] // Chop
```

```
{3383., 1226., 1001., 867.3, 867.1, 0}
```

```
N[valFC * 10^-9, 4] // Chop
```

```
{532.7, 373.0, 1.777, 0, 0}
```

```
N[valFN * 10^-9, 4] // Chop
```

$$\left\{613.3,\ 530.2,\ 500.0,\ 406.8,\ 387.5,\ 325.7,\ 1.799 \times 10^{-10},\ 0,\ 0\right\}$$