The polarisation of τ-leptons from the \( \tilde{\tau}_1 \) decay, which gives access to the \( \tilde{\tau}_1 \) and \( \tilde{\chi}_0^1 \) mixing - gauginos conserve flavour. Hence this can be measured with an accuracy better than 15%, eg. from the \( \tau/\tau \rightarrow e/\nu \) decay, from where we measure \( \sin^2 \theta_{\tau\chi} \approx 0.2 \). In this case, the observable \( E_{\text{CMS}} - E_{\text{ISR}}/E_{\text{CMS}} \) can be used to measure the polarisation of \( \tilde{\chi}_0^1 \) by a fit of templates to the data. The \( \tilde{\gamma} \) mixing itself can be extracted in several ways: Comparing the cross-section of different \( \tilde{\tau} \) final states, determining the cross-section for \( \tilde{\tau}_1 \) production, or from the comparing the masses of the non-mixed \( \tilde{\tau} \) and \( \tilde{\chi}_0^1 \).}

**The ILC at full speed:**

**\( \tau \) polarisation and mixing and \( \chi_0^1 \) nature**

The polarisation of \( \tau \)-leptons from the \( \tilde{\tau}_1 \) decay, which gives access to the \( \tilde{\tau}_1 \) and \( \tilde{\chi}_0^1 \) mixing - gauginos conserve flavour. Hence this can be measured with an accuracy better than 15%, eg. from the \( \tau/\tau \rightarrow e/\nu \) decay, from where we measure \( \sin^2 \theta_{\tau\chi} \approx 0.2 \). In this case, the observable \( E_{\text{CMS}} - E_{\text{ISR}}/E_{\text{CMS}} \) can be used to measure the polarisation of \( \tilde{\chi}_0^1 \) by a fit of templates to the data. The \( \tilde{\gamma} \) mixing itself can be extracted in several ways: Comparing the cross-section of different \( \tilde{\tau} \) final states, determining the cross-section for \( \tilde{\tau}_1 \) production, or from the comparing the masses of the non-mixed \( \tilde{\tau} \) and \( \tilde{\chi}_0^1 \).

**Neutrino Mass Generation**

SUSY with bilinear R-parity violation can generate neutrinos via a low-scale seesaw mechanism. In such scenario, neutrino observables for the BRPV couplings. Thus collider measurements of BRPV decays can test the existence of neutrino mass generation.

The ILC, the branching ratios for \( \tilde{\tau}_1 \rightarrow \tilde{\chi}^0_1 + \tilde{\ell} \) and \( \tilde{\tau}_1 \rightarrow H + \tilde{\ell} \) can be measured in LSP pair production. At two-level, their ratio is directly proportional to \( \text{tan}^2 \theta_{23} \) where loop corrections introduce dependence on other SUSY parameters.

\[
\frac{\delta M_{\tilde{\tau}_1 \tilde{\chi}^0_1}}{\delta M_{\tilde{\tau}_1 H}} = 4\% \text{ (stat.)} \pm 0.85\% \text{ (syst.)} \pm 7\% \text{ (par.)}
\]