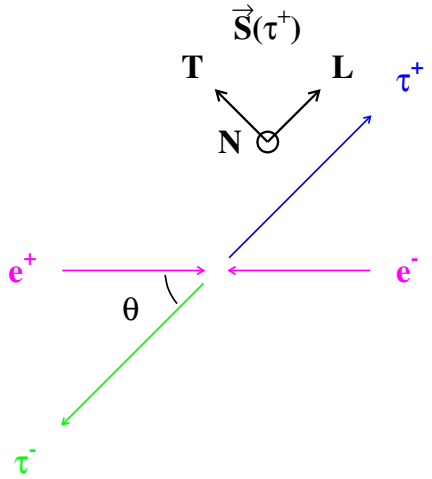
$\tau^+\tau^-$ Spin Correlations



Sensitivity to Coupling of e,τ to Z^0 in SM (v_ℓ,a_ℓ)

- Spin Indep Terms in Decay Rate
  - $\sigma_{\tau\tau} \propto (|v_e|^2 + |a_e|^2)(|v_\tau|^2 + |a_\tau|^2)$
  - $A_\tau^{FB} = \frac{3}{4}\mathcal{A}_e\mathcal{A}_\tau \qquad \mathcal{A}_\ell = 2v_\ell a_\ell{}^*/(|v_\ell|^2 + |a_\ell|^2)$
- L Terms
  - $P_\tau = -Re(\mathcal{A}_\tau) = |\mathcal{A}_\tau|\cos(\Phi_{v_\tau} - \Phi_{a_\tau})$
  - $A_{pol}^{FB} = -Re(\mathcal{A}_e)$
- T,N Terms ⇒ Magnetic Moments (small)
- TT,TN Correlation Terms
  - $C_{TT} = \frac{|a_\tau|^2 - |v_\tau|^2}{|a_\tau|^2 + |v_\tau|^2}$
  - $C_{TN} \sim -Im(\mathcal{A}_\tau) = P_\tau \tan(\Phi_{v_\tau} - \Phi_{a_\tau})$
    + corr's from γ–Z interfer