

Tau polarisation, A_{FB} , A_{LR} , decay modes in $e^+e^- \rightarrow \tau^+ \tau^-$

Short description.

Physics Motivation: measure the coupling between Z and left handed tau, and the coupling between Z and right handed tau. This is going to be very useful to constrain some of the contact interactions, or to test models such as gauge-Higgs unification.

Search Channel: $e^+e^- \tau^+ \tau^-$, tau 1-prong / 3-prong, $E_{cm} = 500$ GeV.

Detector Benchmark: highly boosted tau reconstruction; in 3-prong channel, interesting to test the limit of track separation; in 1-prong channel, interesting to test PFA performance.

Main observables.

final observables: g_L , g_R , (for $Z\tau\tau$ couplings); cross section for $e^+e^- \tau_{L,R}^+ \tau_{L,R}^-$.

intermediate observables: efficiency of tau reconstruction, efficiency of tau decay mode identification, tau polarization

ILD note

ILD-PHYS-PUB-2019-004 can be found on the [ILD notes](#) page (and at [arXiv:1912.08403](https://arxiv.org/abs/1912.08403) [hep-ex]).

Related figures used in the IDR



decmodeEffTimesPur.pdf



compareplot_s...ngammapfo.pdf



drawpexresults0.pdf

People.

[Daniel Jeans](#) and [Keita Yumino](#), reviewed by [Mikael Berggren](#)

References.

Daniel Jeans, "h->tau tau" [LCWS16, ILD0418]

S. Kawada et al., "A study of the measurement precision of the Higgs boson decaying into tau pairs at the ILC", <https://arxiv.org/abs/1509.01885>