(Charge conjugate states are assumed, and $h^{\pm}$ indicates a $\pi^{\pm}$ or $K^{\pm}$.) The $K^*(892)$ is the only resonance included because the $\tau^- \to K^*(892)^- \nu_\tau$ and $K^*(892)^-$ branching fractions are very well measured. By comparison, the $\pi^-\pi^0\nu_\tau$ mode is predominantly $\rho^-\nu_\tau$, but also includes $\rho'^-\nu_\tau$ and any nonresonant component.

Kaons present several of special problems at the 0.5% level, whether they come directly from τ^- decay or from the decay of an intermediate K^*. This comes about for several reasons:

(a) Most experiments lack charged particle identification, and hence our basis modes of the form "m charged hadrons + $(\geq)n\pi^0$'s" must include directly produced kaons but exclude those from $K^*(892)$ decay.

(b) K_L's are usually undetected.

(c) $K_S \to \pi^+\pi^-$ causes confusion even for the topological branching ratios, since it is only recently that they can be sorted out with practical efficiency. Even so, branching ratios to final states containing K_S's (exclusive of those with an intermediate $K^*(892)$) are poorly known. For the moment, events containing such decays are counted with the 3-prong modes.

Experimenters often make corrections for various kaon backgrounds. Because of our present definition of the basis modes, the *only* background defined in our Listings for the "m charged hadrons + $(\geq)n\pi^0$'s" modes are the contributions from $K^*(892)$ decay. Thus, all results must be corrected for the different assumptions that the experimenters made about background definitions, at least to the degree that they are documented in the papers. The $K^*(892)^-$ branching fractions to the final states are as follows:

$K^*(892)^- \to K^-\pi^0$	1/3
$\quad \hookrightarrow K^0\pi^- \to K_L\pi^-$	1/3
$\qquad \hookrightarrow K_S\pi^- \to \pi^-\pi^+\pi^-$	0.2286
$\qquad\quad \hookrightarrow \pi^-\pi^0\pi^0$	0.1046

These branching fractions appear throughout the listings. For example, the topological 1-prong mode includes 0.771 $\mathrm{B}(K^*(892)^-\nu_\tau)$ (since $1/3 + 1/3 + 0.1046 = 0.7712$), while the 3-prong fraction includes the remaining 0.229 $\mathrm{B}(K^*(892)^-\nu_\tau)$. Similarly, $\mathrm{B}(h^-\nu_\tau) = \mathrm{B}(\pi^-\nu_\tau) + \mathrm{B}(K^-\nu_\tau) + \frac{1}{3}\mathrm{B}(K^*(892)^-\nu_\tau)$ because of the unseen K_L's, and $\mathrm{B}(h^-\pi^0\nu_\tau) = \mathrm{B}(\pi^-\pi^0\nu_\tau) + \frac{1}{3}\mathrm{B}(K^*(892)^-\nu_\tau)$ because of the $K^-\pi^0$ final states from $K^*(892)^-$ decay.

The present basis mode definitions contain many inconsistencies at the few tenths of a percent level. In principle, the above examples should contain contributions from $\pi^- K_L \overline{K}_L$, $K^-\overline{K}_L$, nonresonant $(\pi K)^-$ states, *etc.* We also define $\mathrm{B}(h^- \geq 3\pi^0\nu_\tau)$ as the sum of states containing 3 π^0's and 4 π^0's, neglecting those with 5 or more neutral pions. Hopefully, these inconsistencies enter at levels well below the uncertainties of present experiments. The set of basis modes is under constant reevaluation, and in fact has been changed in each of our last three editions. Revision will continue, as better detectors record larger numbers of τ decays with better-understood systematics. Perhaps one day most events containing $K_S \to \pi^+\pi^-$ will be classified as 1-prong events, and high-quality older results will be corrected accordingly.

τ^- BRANCHING RATIOS

$\Gamma(\text{particle}^- \geq 0 \text{ neutrals } \nu_\tau \text{ ("1-prong")})/\Gamma_{\text{total}}$
$\Gamma_1/\Gamma = (\Gamma_2+\Gamma_4+\Gamma_7+\Gamma_9+\Gamma_{13}+\Gamma_{16}+\Gamma_{18}+\Gamma_{19}+0.771\Gamma_{41})/\Gamma$

The charged particle here can be e, μ, or hadron. In many analyses, the sum of the topological branching fractions (1, 3, and 5 prongs) is constrained to be unity. Since the 5-prong fraction is very small, the measured 1-prong and 3-prong fractions are highly correlated and cannot be treated as independent quantities in our overall fit. We arbitrarily choose to use the 3-prong fraction in our fit, and leave the 1-prong fraction out. We do, however, use these 1-prong measurements in our average below. The measurements used only for the average are marked "avg," whereas "f&a" marks a result used for the fit and the average.

VALUE (%)		*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
85.49±0.24 OUR FIT Error includes scale factor of 1.5.					
85.46±0.30 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.					
84.48±0.27±0.23	avg		ACTON 92H	OPAL	E^{ee}_{cm}= 88.2–94.2 GeV
$85.45^{+0.69}_{-0.73}\pm0.65$	f&a		DECAMP 92C	ALEP	E^{ee}_{cm}= 88–95 GeV
85.6 ±0.6 ±0.3	avg	3300	[10] ADEVA 91F	L3	E^{ee}_{cm}= 88.3–94.3 GeV
86.4 ±0.3 ±0.3	avg		ABACHI 89B	HRS	E^{ee}_{cm}= 29 GeV
84.9 ±0.4 ±0.3	avg		BEHREND 89B	CELL	E^{ee}_{cm}= 14–47 GeV
84.7 ±0.8 ±0.6	avg		[11] AIHARA 87B	TPC	E^{ee}_{cm}= 29 GeV
87.2 ±0.5 ±0.8	avg		SCHMIDKE 86	MRK2	E^{ee}_{cm}= 29 GeV
$84.7\pm1.1^{+1.6}_{-1.3}$	avg	169	[12] ALTHOFF 85	TASS	E^{ee}_{cm}= 34.5 GeV
86.1 ±0.5 ±0.9	avg		BARTEL 85F	JADE	E^{ee}_{cm}= 34.6 GeV
87.8 ±1.3 ±3.9	avg		[13] BERGER 85	PLUT	E^{ee}_{cm}= 34.6 GeV
86.7 ±0.3 ±0.6	avg		FERNANDEZ 85	MAC	E^{ee}_{cm}= 29 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
87.1 ±1.0 ±0.7			[14] BURCHAT 87	MRK2	E^{ee}_{cm}= 29 GeV
86.9 ±0.2 ±0.3		4098	AKERLOF 85B	HRS	Repl. by ABACHI 89B
85.2 ±0.9 ±1.5		660	AIHARA 84C	TPC	Repl. by AIHARA 87B
85.2 ±2.6 ±1.3		178	BEHREND 84	CELL	Repl. by BEHREND 89B
85.1 ±2.8 ±1.3		182	BEHREND 84	CELL	Repl. by BEHREND 89B
84.0 ±2.0		672	BEHREND 82	CELL	Repl. by BEHREND 89B
86 ±2 ±1		764	BLOCKER 82C	MRK2	Repl. by SCHMIDKE 86

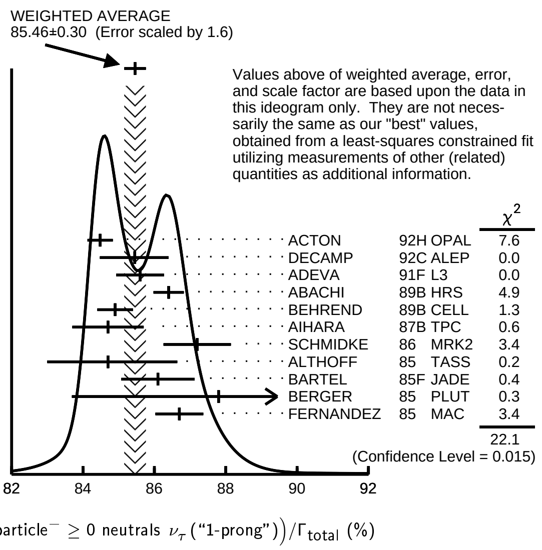
[10] Not independent of ADEVA 91F $\Gamma(2h^- h^+ \geq 0 \text{ neutrals } \nu_\tau \text{ ("3-prong")})/\Gamma_{\text{total}}$ value.

[11] Not independent of AIHARA 87B $\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(e^-\overline{\nu}_e\nu_\tau)/\Gamma_{\text{total}}$, and $\Gamma(h^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ values.

[12] Not independent of ALTHOFF 85 $\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(e^-\overline{\nu}_e\nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(h^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$, and $\Gamma(2h^- h^+ \geq 0 \text{ neutrals } \nu_\tau \text{ ("3-prong")})/\Gamma_{\text{total}}$ values.

[13] Not independent of (1-prong + $0\pi^0$) and (1-prong + $\geq 1\pi^0$) values.

[14] Not independent of SCHMIDKE 86 value (also not independent of BURCHAT 87 value for $\Gamma(2h^- h^+ \geq 0 \text{ neutrals } \nu_\tau \text{ ("3-prong")})/\Gamma_{\text{total}}$.



$\Gamma(\text{particle}^- \geq 0 \text{ neutrals } \nu_\tau \text{ ("1-prong")})/\Gamma_{\text{total}}$ (%)