π^0 reconstruction efficiency correction

This is an additional material to the thesis *Study of the τ lepton decays at the Belle II experiment* by Zuzana Gruberova (available at the Belle II Document Server as BELLE2-MTHESIS-2021-007).

Table 1: π^0 reconstruction efficiency correction.

π^0 selection	central value	stat. error	total syst. error	total error
Low	0.901	0.011	0.011	0.015
Nom	0.914	0.007	0.018	0.020
Eff60	0.830	0.008	0.007	0.011
Eff50	0.929	0.009	0.011	0.014
Eff40	0.911	0.011	0.014	0.018
Eff30	0.902	0.010	0.015	0.018
Eff20	0.911	0.010	0.020	0.022
Eff10	0.894	0.012	0.033	0.035

Tab. 1 lists the measured π^0 reconstruction efficiency correction as displayed in Fig. 1 (Fig. 8.3 of the thesis). The correction is given for eight different π^0 selections: "Low" and "Nom" are the τ group selections, "Eff60", "Eff50", "Eff40", "Eff30", "Eff20" and "Eff10" are the recommended selections provided by the neutrals group.

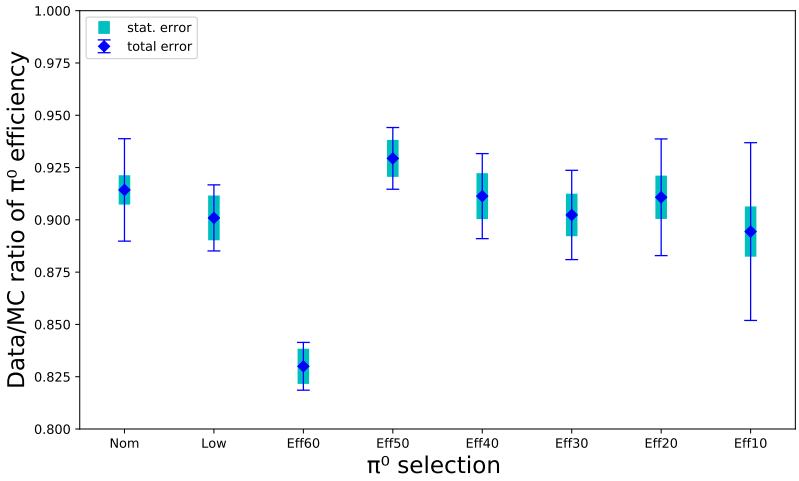

Figure 1: *Average π^0 reconstruction efficiency correction.*

The central value is calculated as

$$\eta_{\pi^0} = \frac{N^{data}(\tau \to 3\pi\pi^0\nu_\tau)}{N^{MC}(\tau \to 3\pi\pi^0\nu_\tau)} \div \frac{N^{data}(\tau \to 3\pi\nu_\tau)}{N^{MC}(\tau \to 3\pi\nu_\tau)}, \tag{1}$$

(Eq. 5.2 of the thesis). The statistical and systematic uncertainties are summed in quadrature to give the total uncertainty. The total systematic uncertainty includes the following systematics: fit function uncertainty, luminosity uncertainty, trigger efficiency uncertainty, leptonID efficiency uncertainty, leptonID fake rate uncertainty, BR uncertainty, tracking efficiency uncertainty.

For more information please refer to the thesis itself.