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Update on taus and invisible Higgs

Level-1 1T and 2T thresholds optimization

$H^+ \to \tau\nu$ selection at HLT with E_T^{miss}

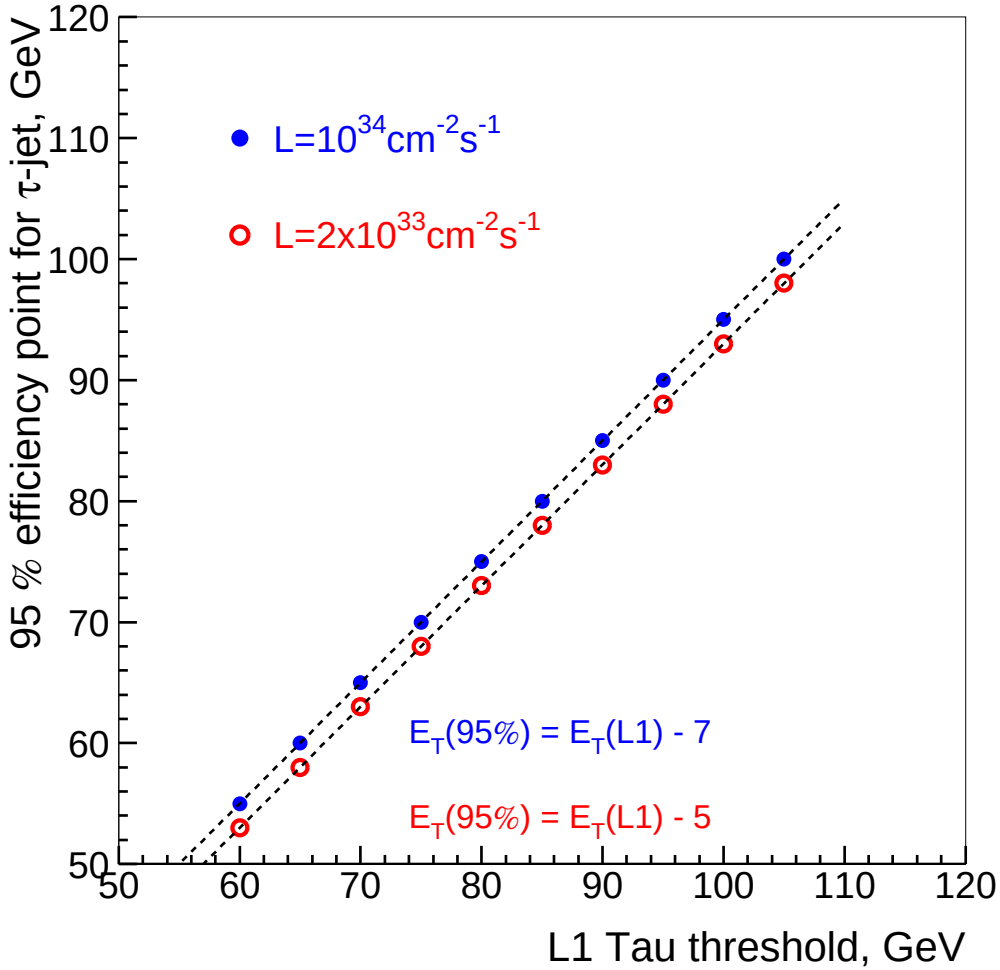
invisible Higgs selections at Level-1 and HLT

with :

latest Andrey's corrections

Branson weights (jetmet ntuples)

Level-1 Tau threshold v.s. 95 % efficiency point with the latest energy corrections



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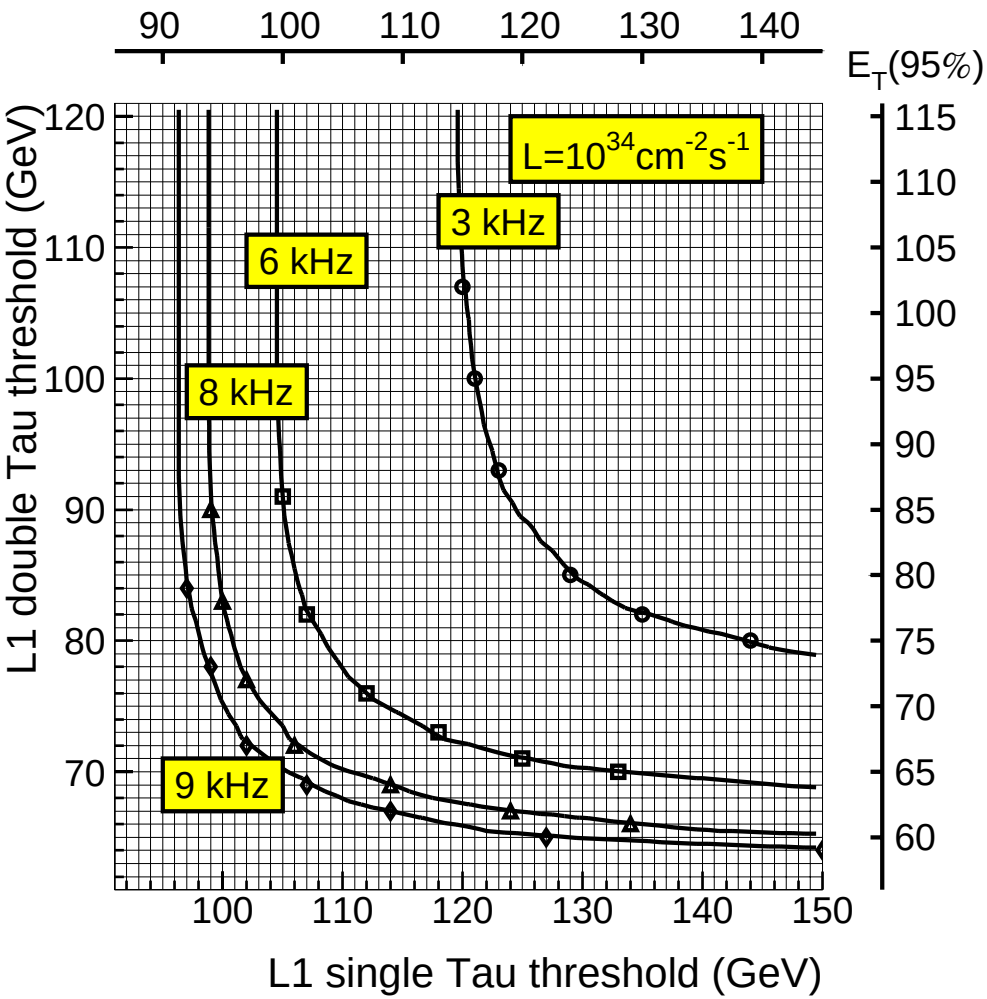
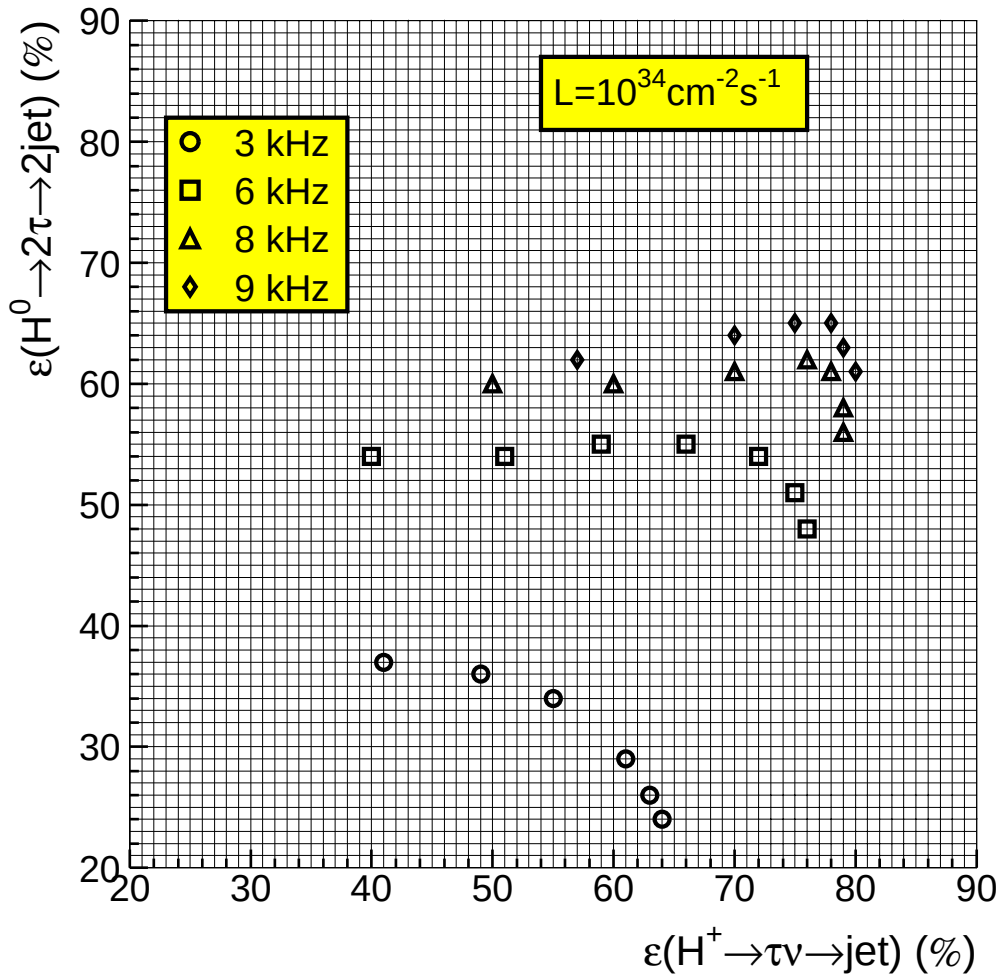
Optimization of Levl-1 1T v.s. 2T trigger thresholds at $L=10^{34}cm^{-2}s^{-1}$





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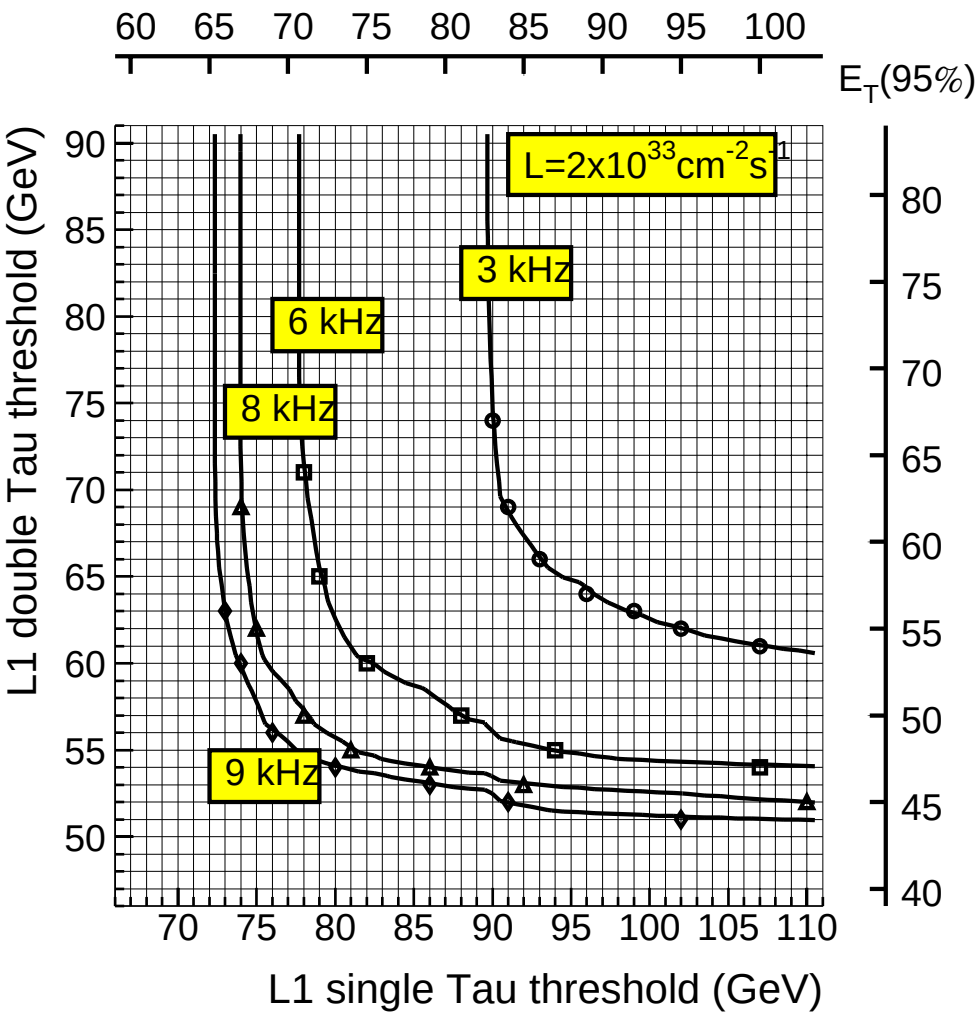
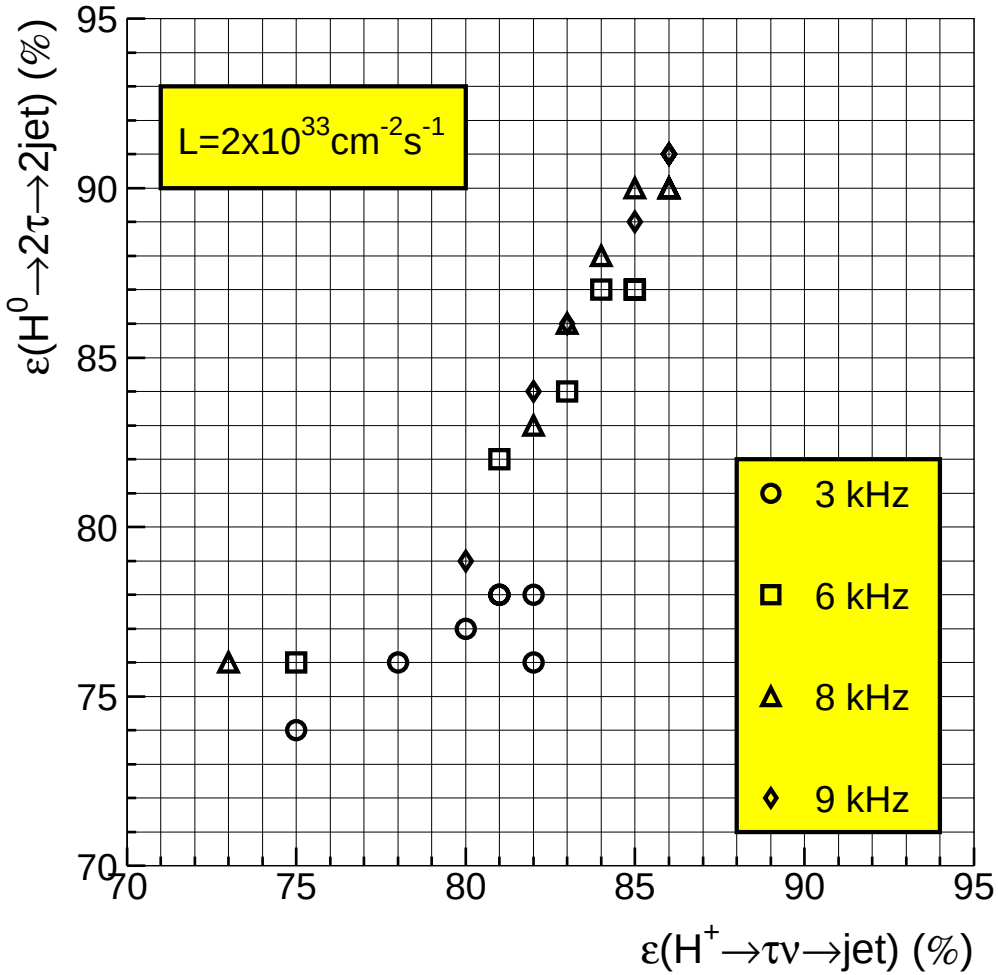
Optimization of Level-1 1T v.s. 2T trigger thresholds at $L=2x10^{33}cm^{-2}s^{-1}$





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Working points of Level-1 1T and 2T

rate, kHz	luminosity	1T threshold (95 %), GeV	2T threshold (95%), GeV	$\varepsilon(H^0 \to 2\tau)$ M_H=200 GeV	$\varepsilon(H^+ \to \tau\nu)$ M_H=200 GeV
3	low	93 (86)	66 (59)	0.78	0.81
	high	129(124)	85(80)	0.34	0.55
6	low	82(75)	60(53)	0.87	0.84
	high	112(107)	76(71)	0.54	0.72
8	low	78(71)	57(50)	0.90	0.85
	high	106(101)	72(67)	0.62	0.76
9	low	76(69)	56(49)	0.91	0.86
	high	102(97)	72(67)	0.65	0.78

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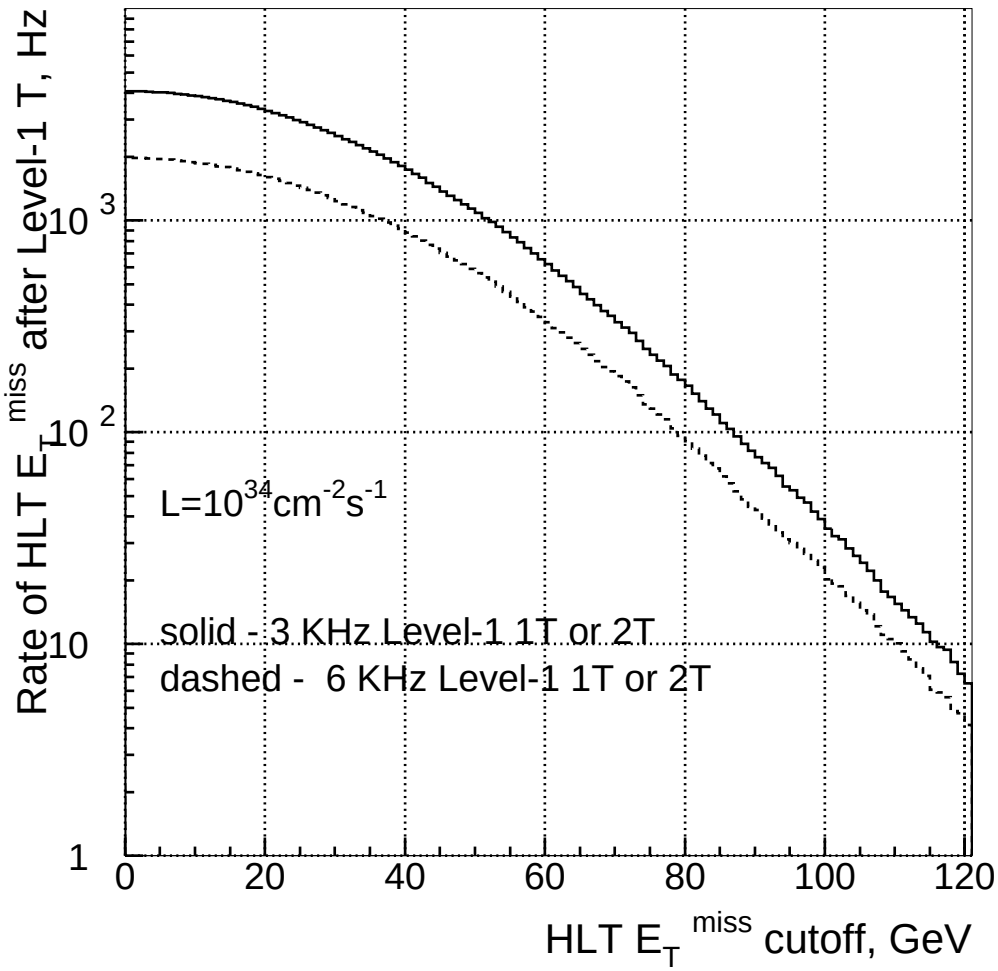
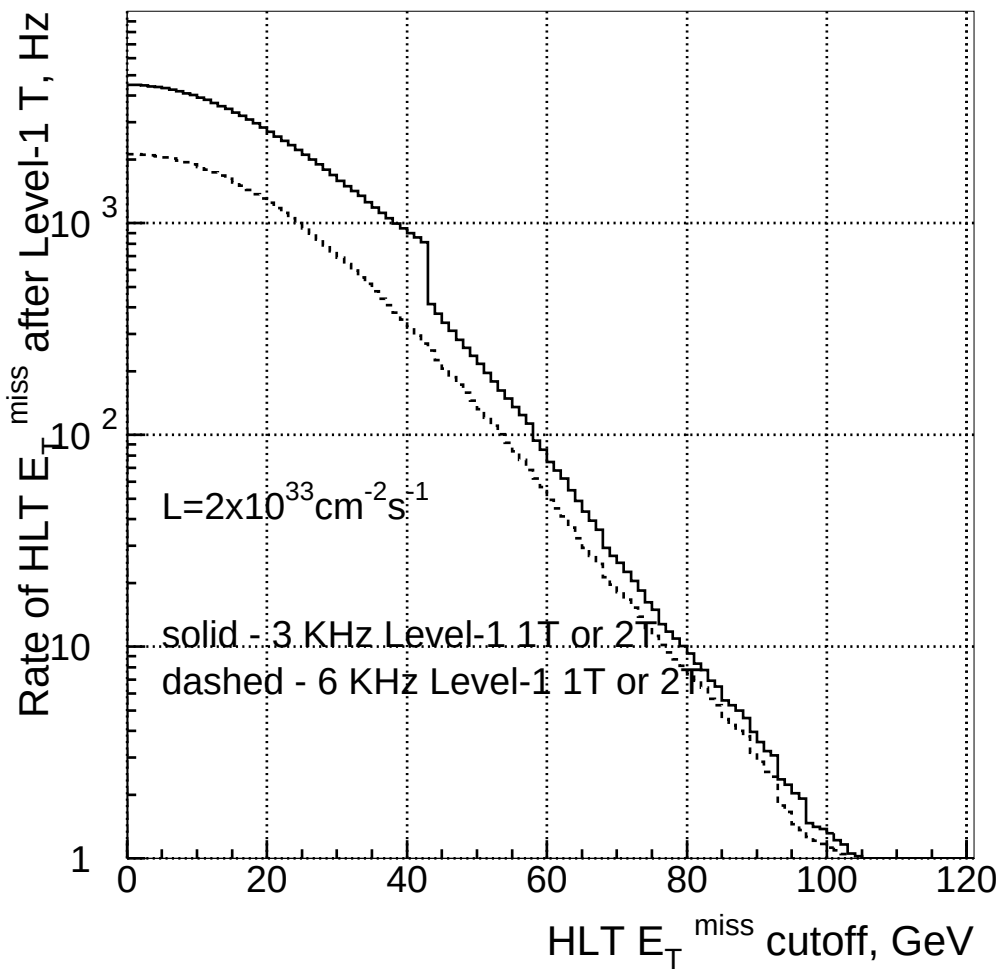
$H^+ \to \tau\nu$: strategy at Calo + Trk HLT

off-line cut : E_T^{miss} > 100 GeV. Let's do it at HLT for Level-1 1T stream



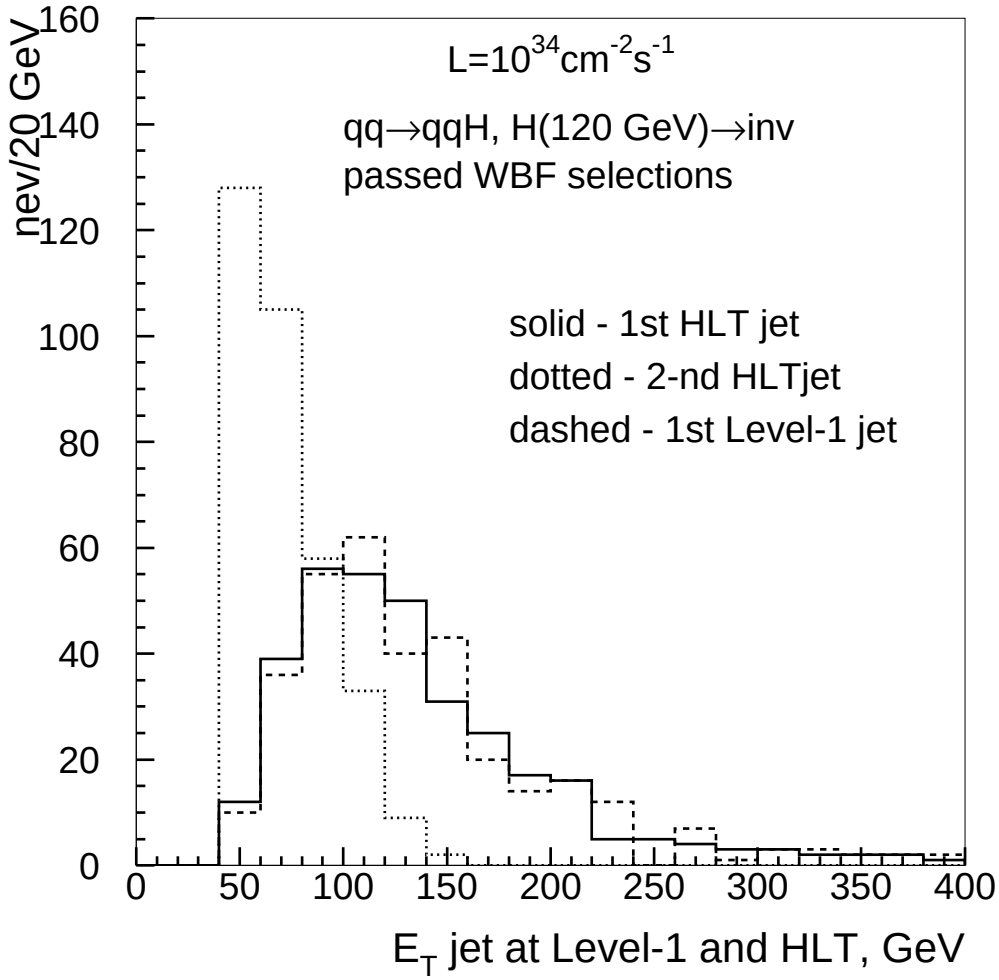


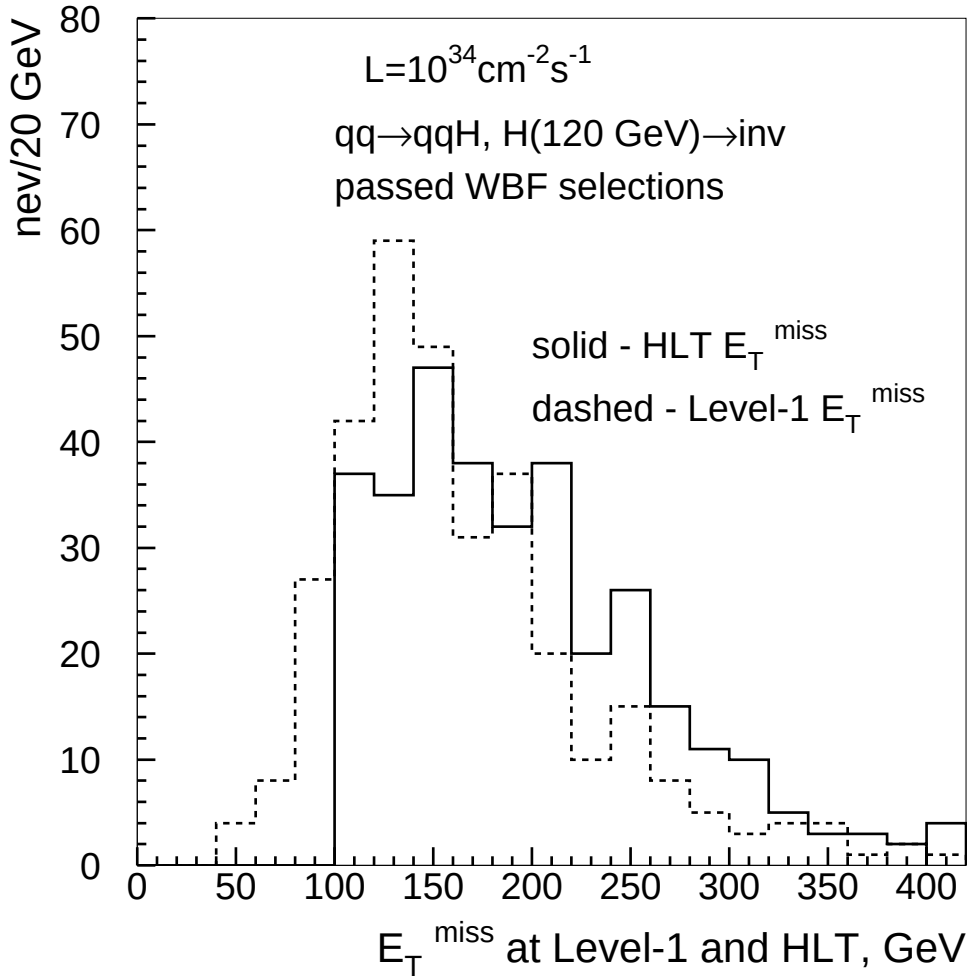
and apply then HLT Tracker Tau selection with rejection factor ~ 30

qq->qqH, H->invisible : possible strategy at Level-1 and HLT (I)

efficiency is defined for Higgs events passed off-line WBF cuts :

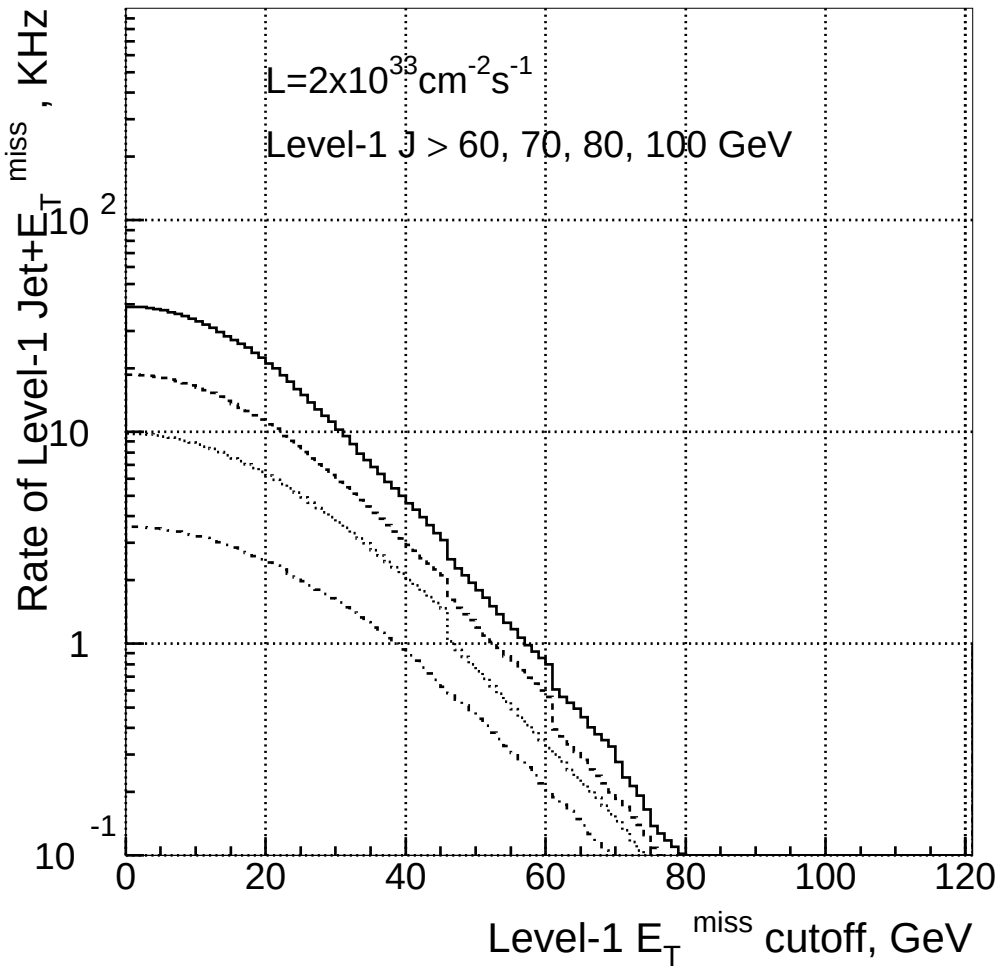
$E_T^J > 40$ GeV, $|\eta_{j1} - \eta_{j2}| > 4.4$, $\eta_{j1}\eta_{j2} < 0$, $M_{j1j2} > 1200$ GeV, $\phi_{j1j2} < 1$, $E_T^{miss} > 100$ GeV

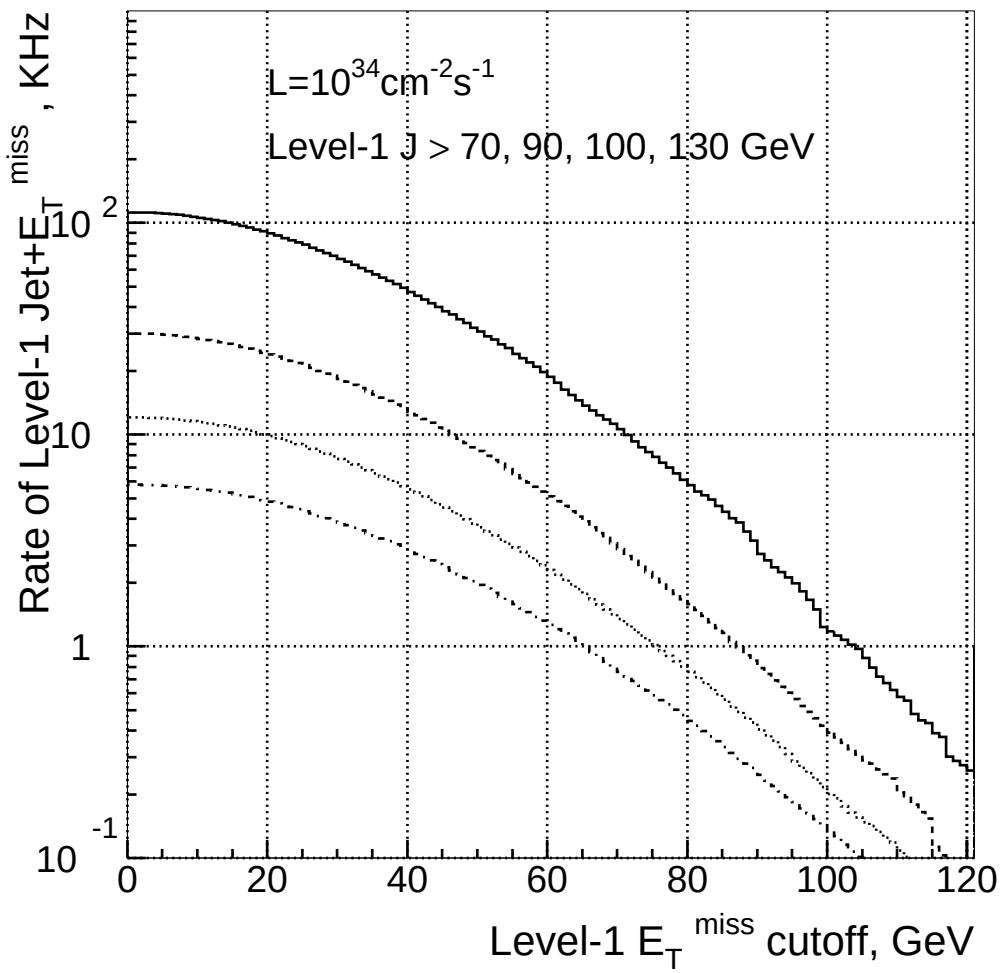




qq->qqH, H->invisible : possible strategy at Level-1 and HLT (II)

Level-1 Jet + E_T^{miss}

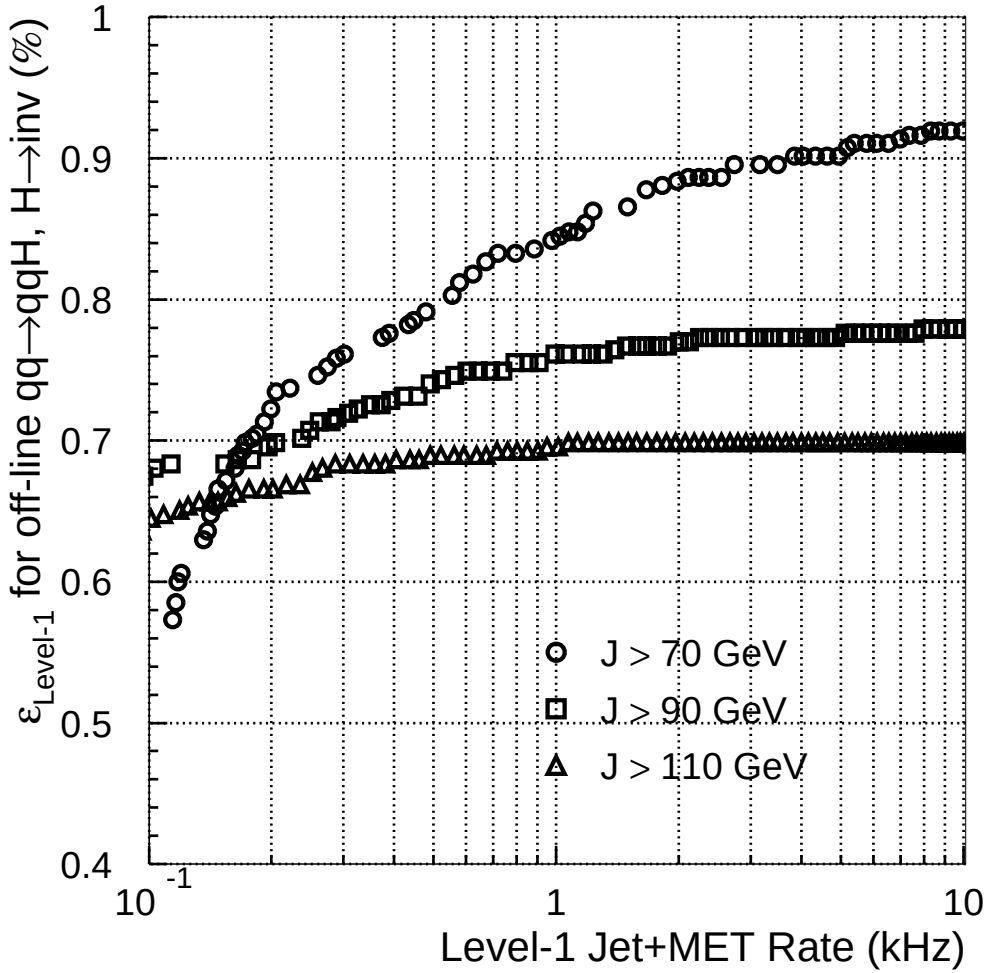




optimization on the next page

qq->qqH, H->invisible : possible strategy at Level-1 and HLT (III)

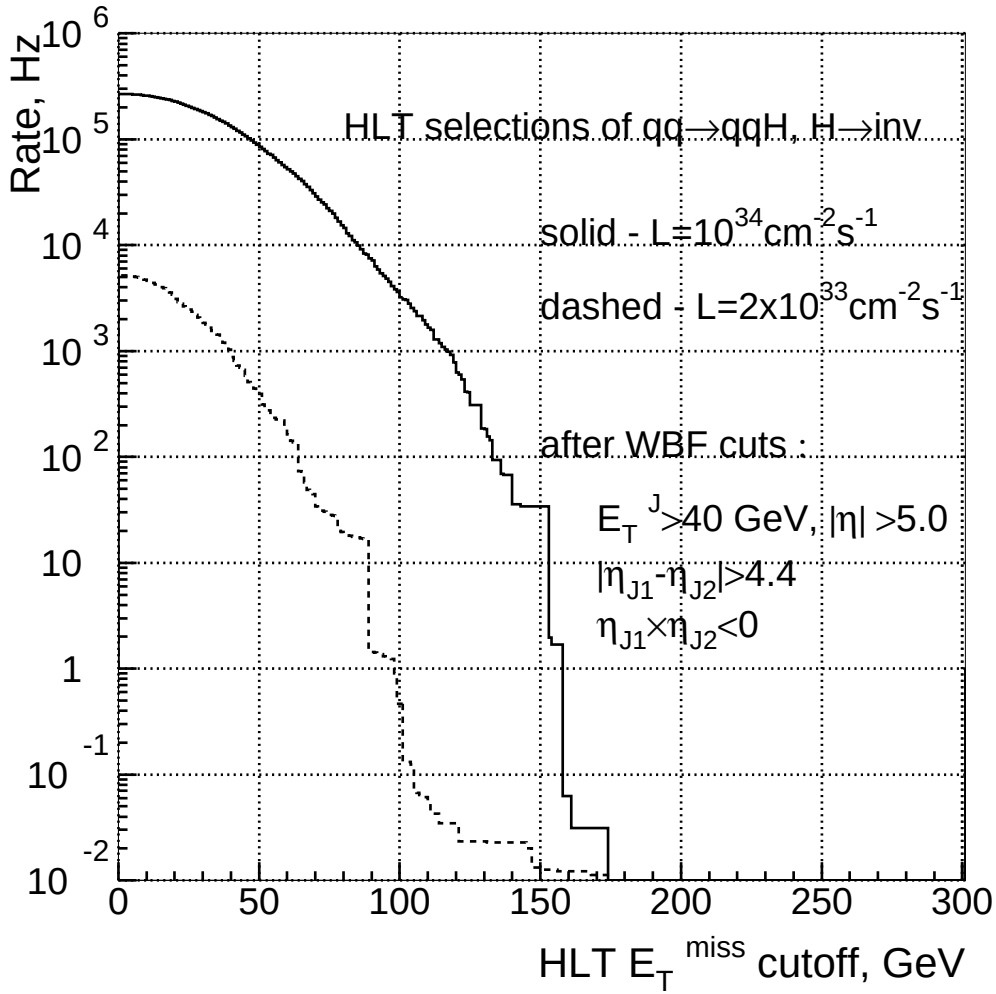
Level-1 Jet + E_T^{miss} optimization

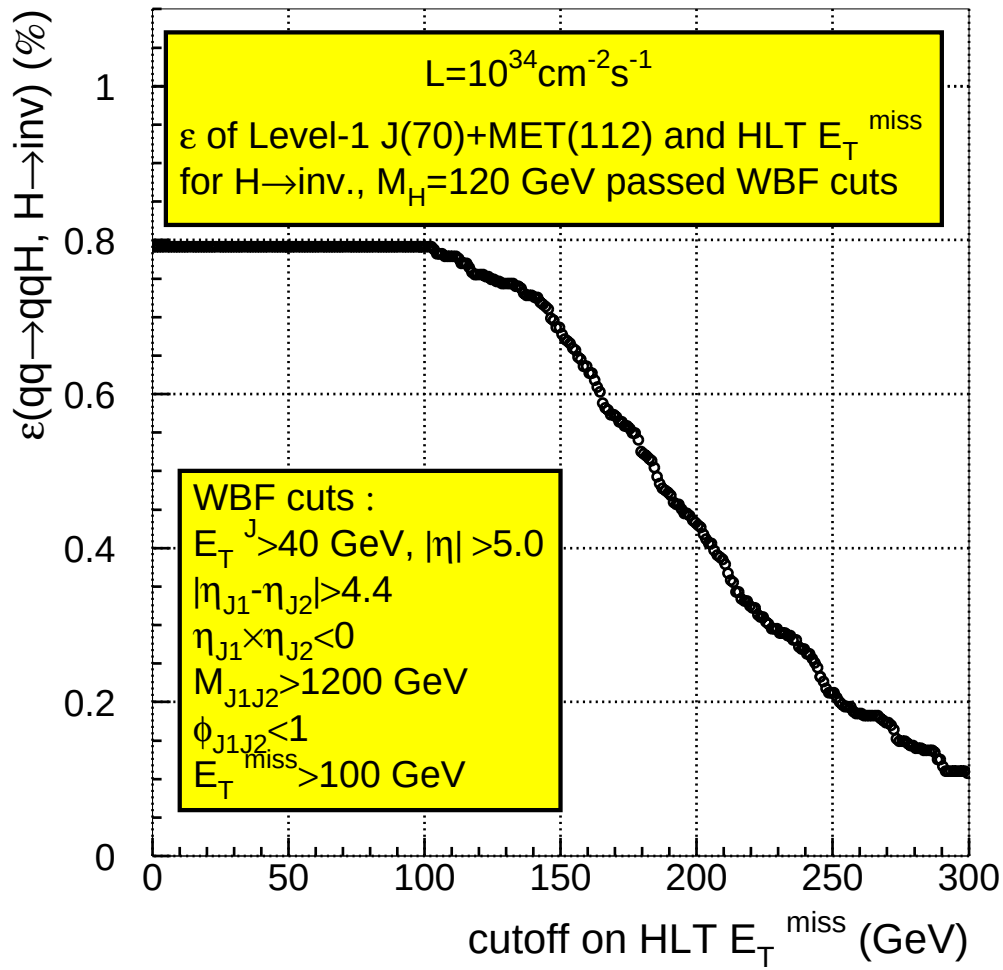


0.5 kHz rate of Level-1 Jet (70)+ E_T^{miss} (112 GeV) for ε = 0.8

qq->qqH, H->invisible : possible strategy at Level-1 and HLT (IV)

HLT with WBF cuts, optimization of E_T^{miss} cutoff





- M_{j1j2} cutoff is not applied yet for bkg. rates
- ϕ_{j1j2} cut is not desirable for H->inv, since prevents physics background estimates from the data (QCD/EW W/Z bkg)