Solar neutralinos 00-03

- reweighting nusim events to neutralino events
- first comparisons
- conclusion & outlook

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AMANDA

IceCube

why use wimpnu???

nusim = E^{-1} neutrino generator
= neutrino propagator
= CC interaction simulator
= fast and simplifies simu(perl)lation matters

wimpnu = nusim reweighted for **E_ν** and **$theta_\nu$**

depends on wimp mass
annihilation channel

depends on solar trajectory

MC generation and processing

	atmnu	**wimpnu**	**wimp (alfio)**
generator	nusim E^{-1}	nusim E^{-1}	wimpsimp+wf2f2000+genniup (500 hard + 5000 hard)
E_ν [GeV]	$10...10^8$	$10...10^4$	$10...mass_{wimp}$
$theta_\nu$ [º]	80...180	90...113.45	90...113.45
#gen nu's	10^6	10^7	$1.5x10^6$
#trig mu's	$\sim 1.5x10^5$	$\sim 2.7x10^5$	$\sim 2x10^4$

SiegLinde

only L0 recontructable events
(DW or DWIMP)

reweighting E^{-1} nusim to E^{gamma}

theta dependent generation plane

new energy spectrum

intweight*r14*r1*r1^{gamma}

interaction weight

neutrino energy

reweighting to a wimp spectrum

theta dependent generation plane

fit to wimp spectrum

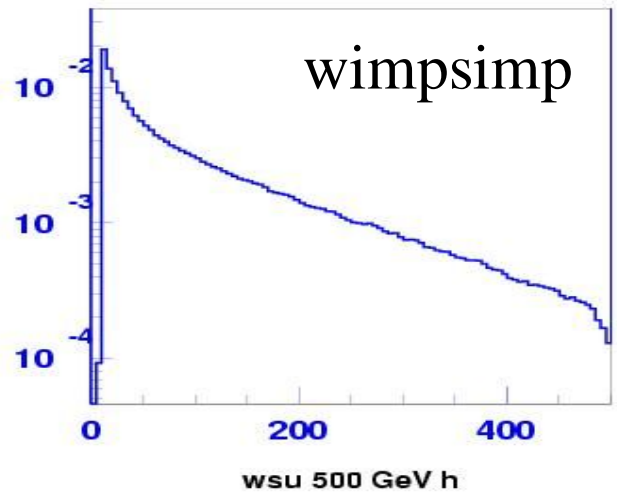
intweight*r14*r1*wimpfit(r1)

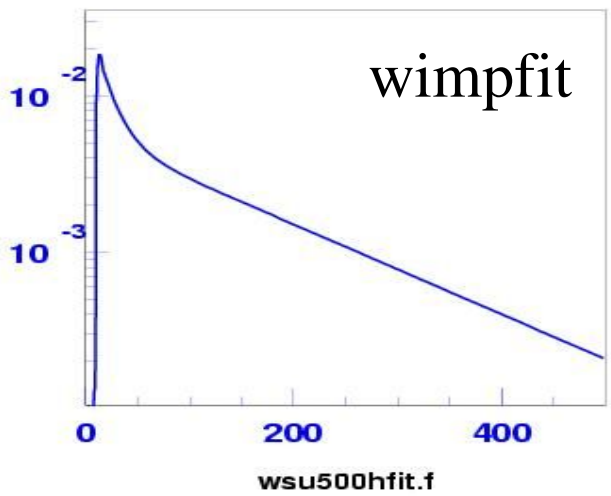
interaction weight

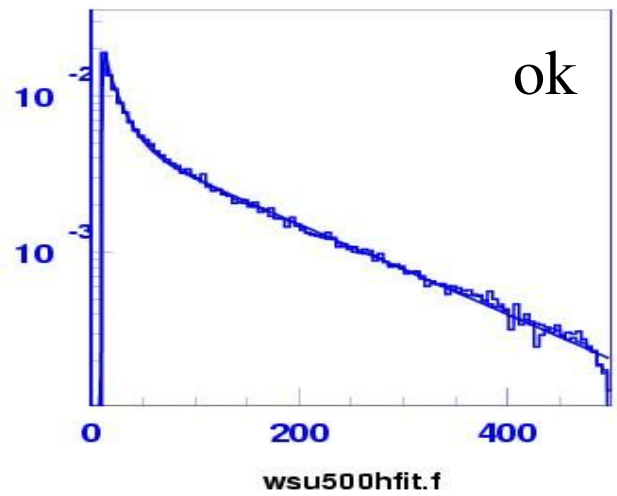
neutrino energy

fit to wimp-neutrino E spectrum (carlos)

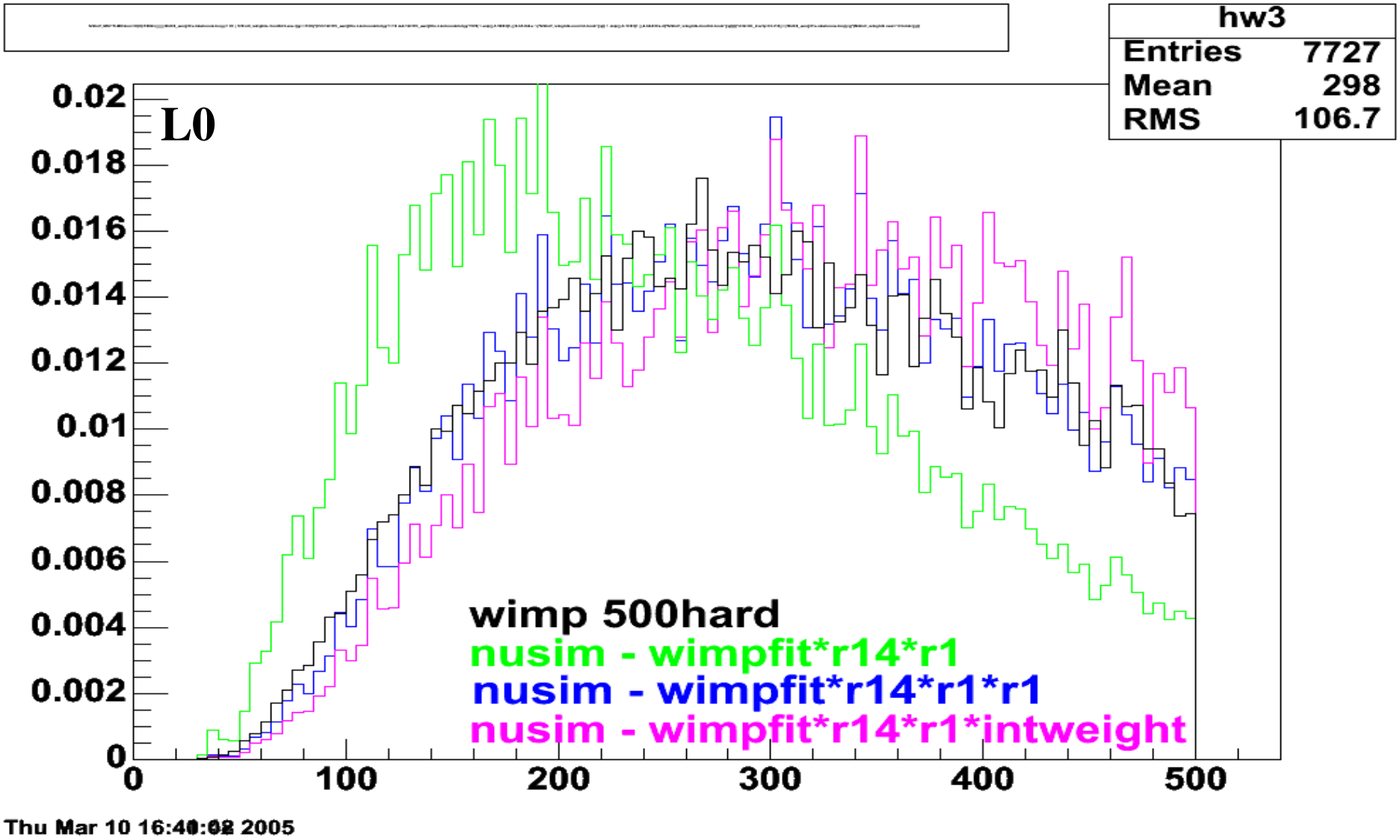
2005/03/16 17.22



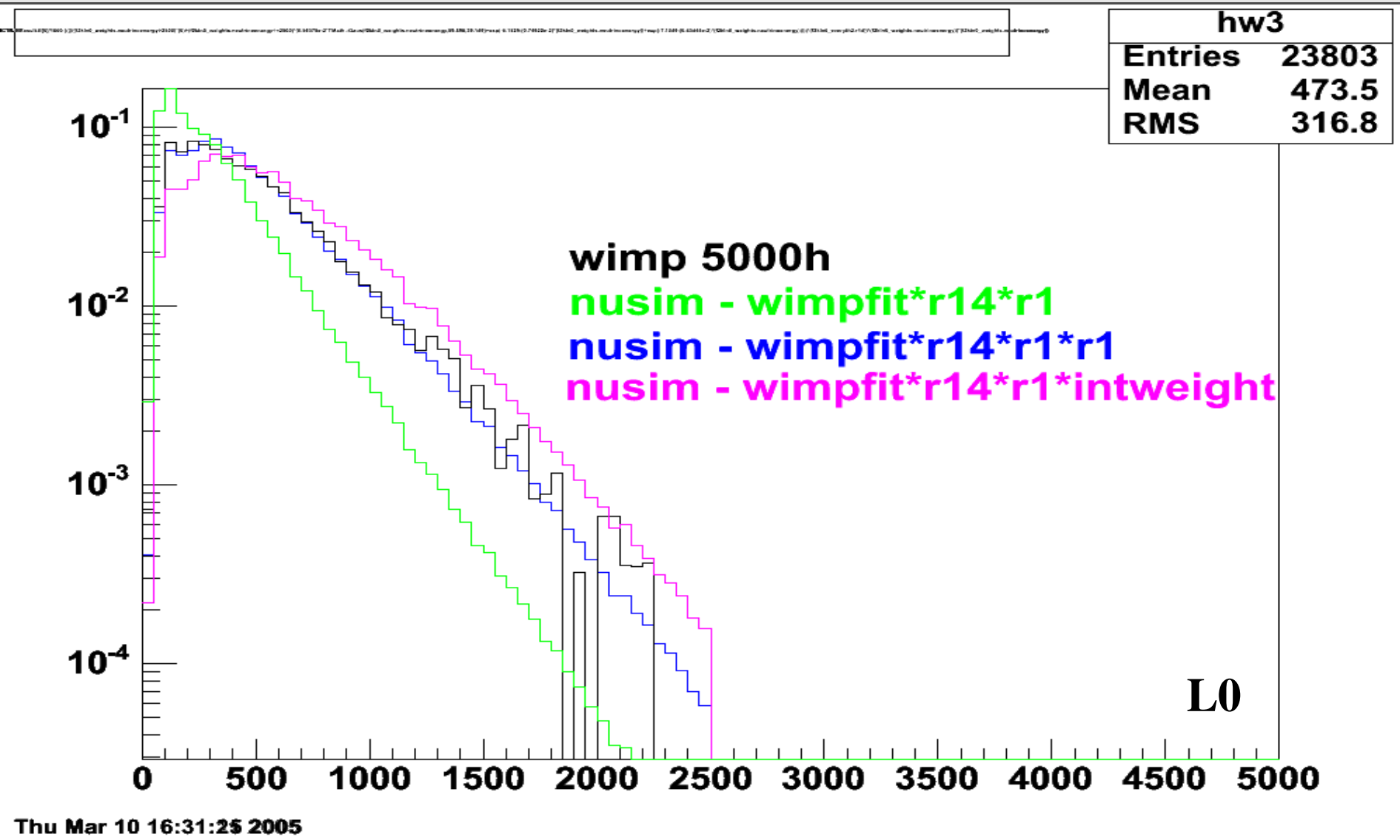




what one sees (500GeV hard)



what one sees (5000GeV hard)



reweighting to a solar theta spectrum

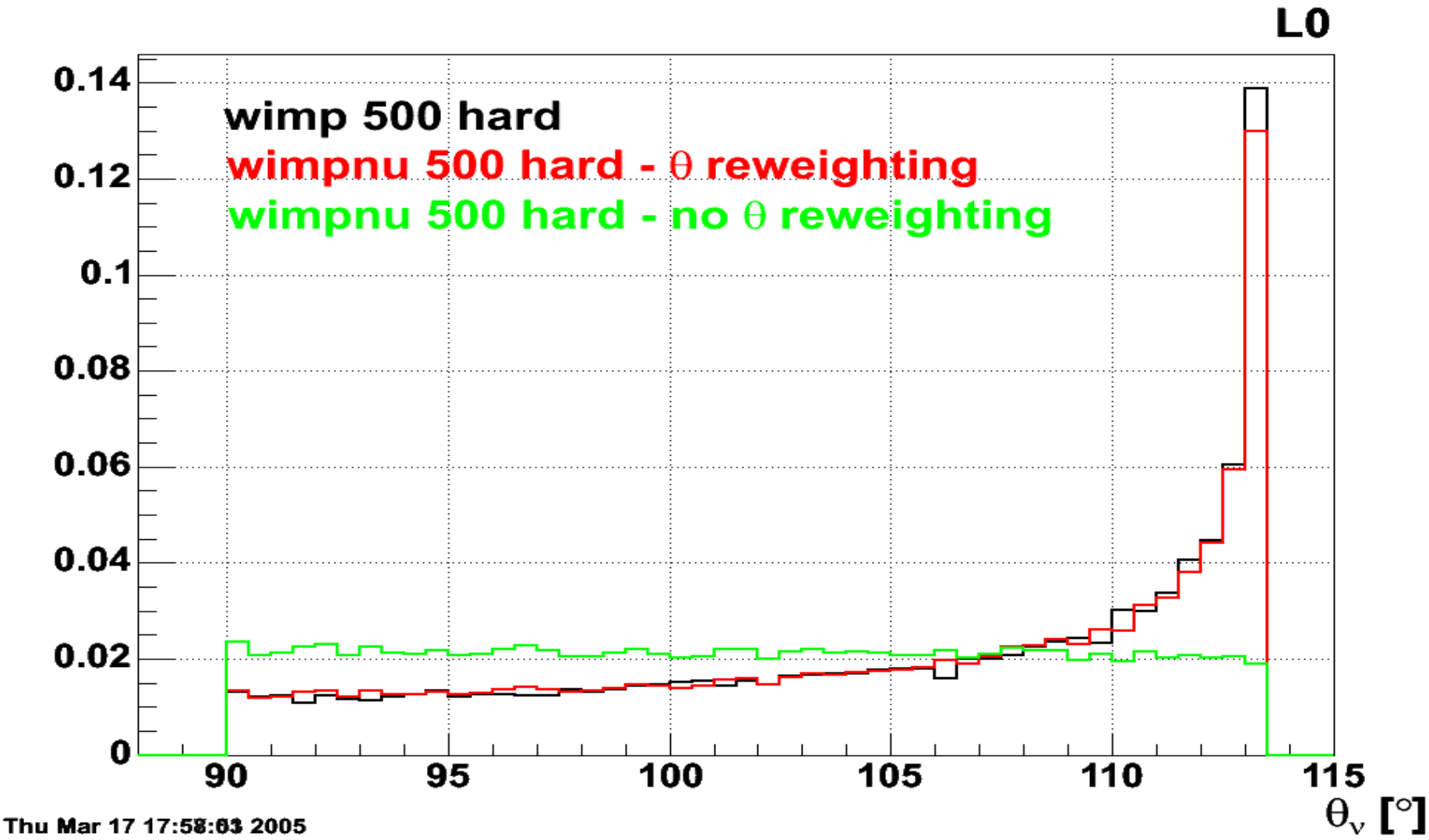
$$theta = 90 - 23.45 \cos(2\, pi\, t)$$

$$C = \frac{dn}{dcos(theta)}$$

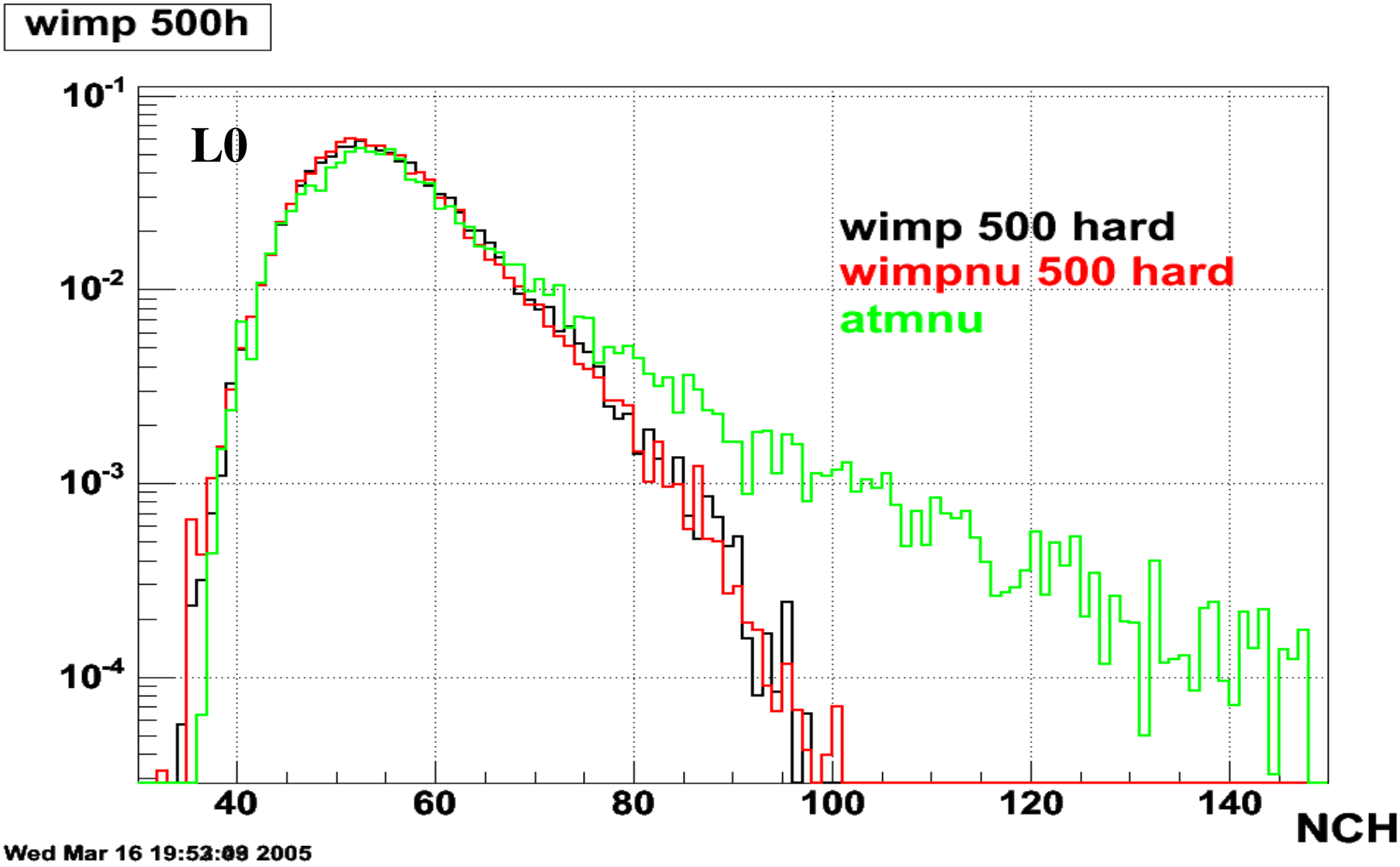
$$= \frac{dn}{dt} \cdot \frac{dt}{dcos(theta)} = \frac{dn}{dt} \cdot w(theta)$$

$$w(theta) = \frac{1}{\sin(theta)\sqrt{1 - \left(\frac{90 - theta}{23.45}\right)^2}}$$

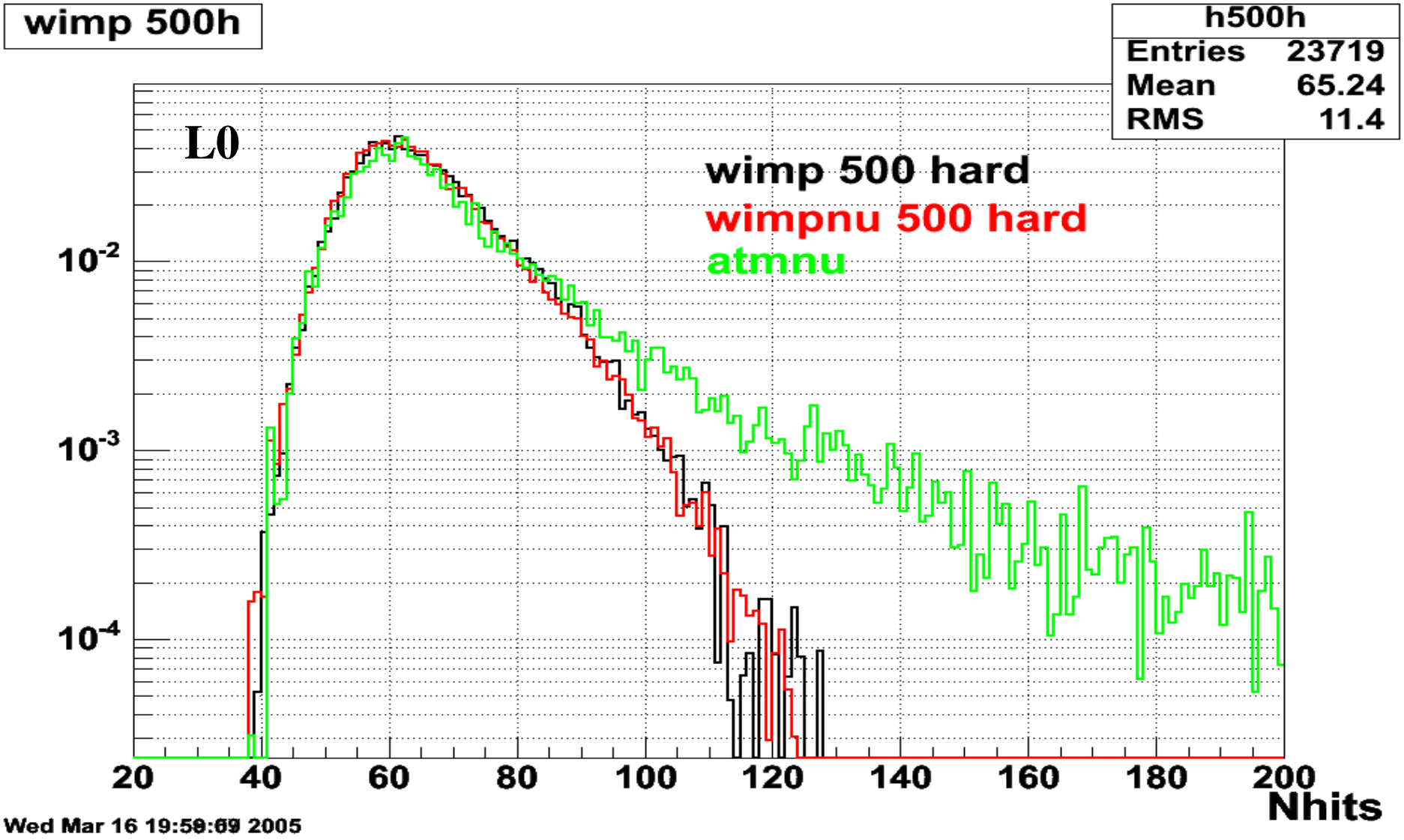
theta distributions ok!



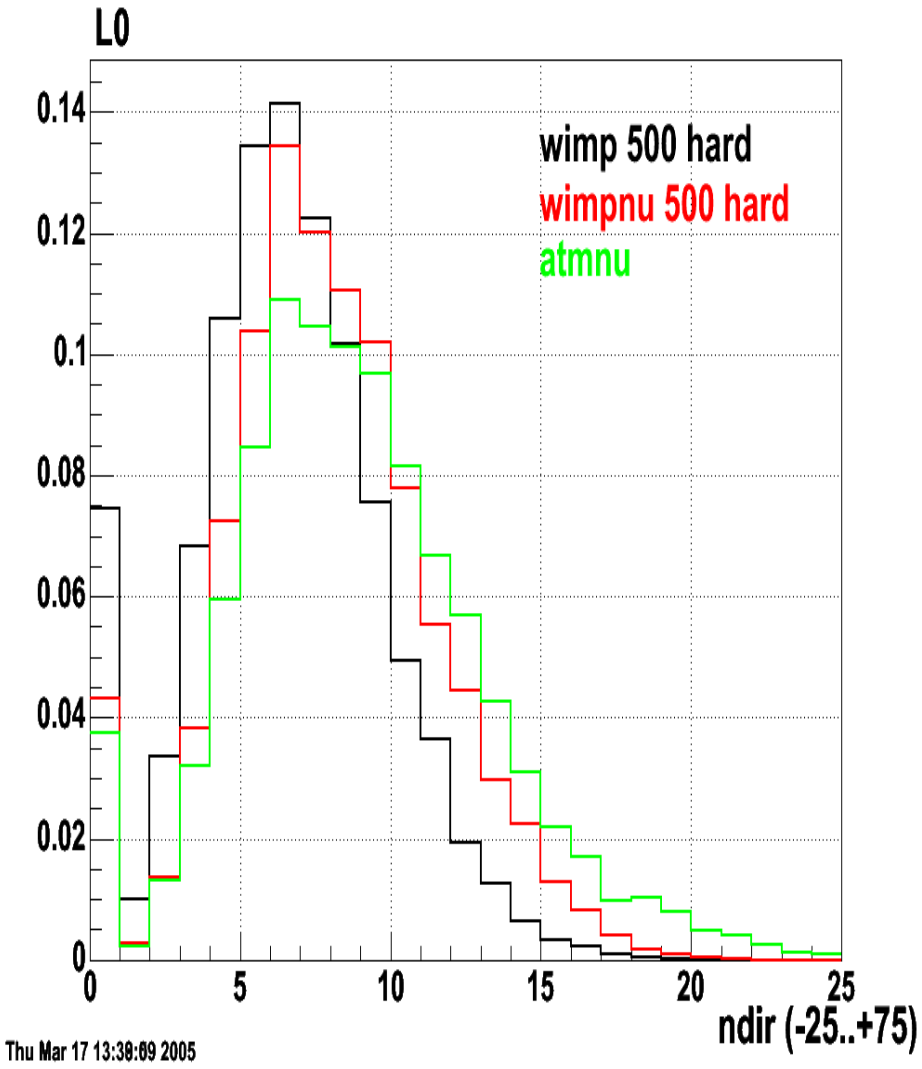
nch

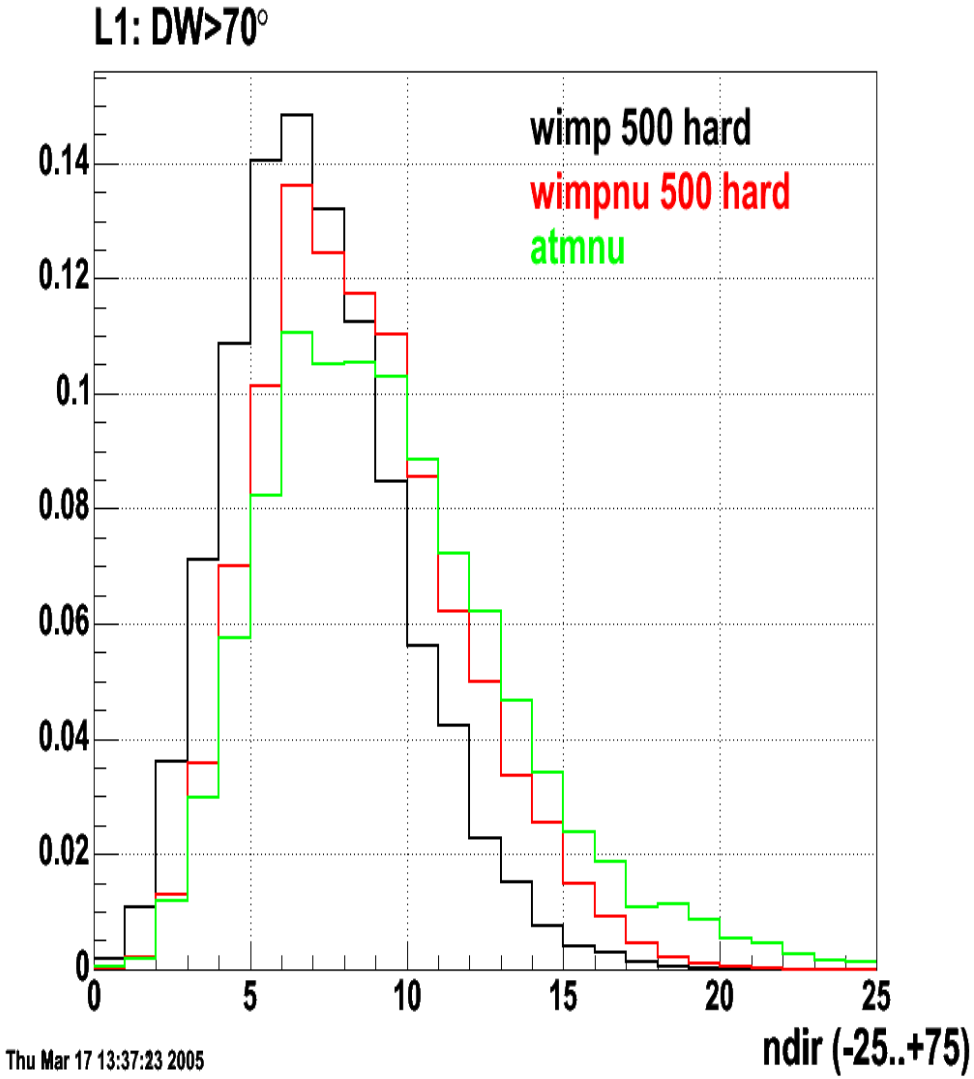

wimp 500h
L0
wimp 500 hard
wimpnu 500 hard
atmnu
10^{-1}
10^{-2}
10^{-3}
10^{-4}
40
60
80
100
120
140
NCH
Wed Mar 16 19:52:09 2005

nhits

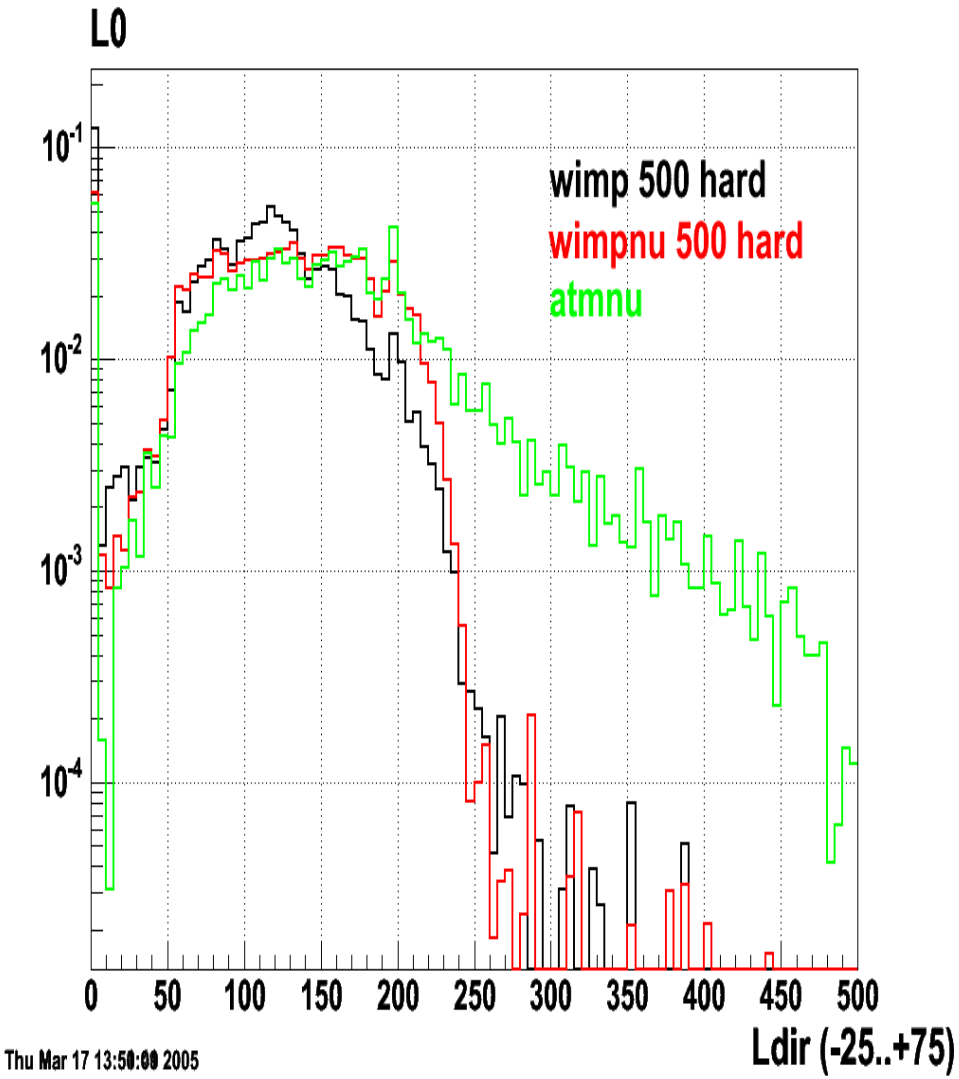

wimp 500h
h500h
Entries 23719
Mean 65.24
RMS 11.4
L0
wimp 500 hard
wimpnu 500 hard
atmnu
10^{-2}
10^{-3}
10^{-4}
20
40
60
80
100
120
140
160
180
200
Nhits
Wed Mar 16 19:58:69 2005

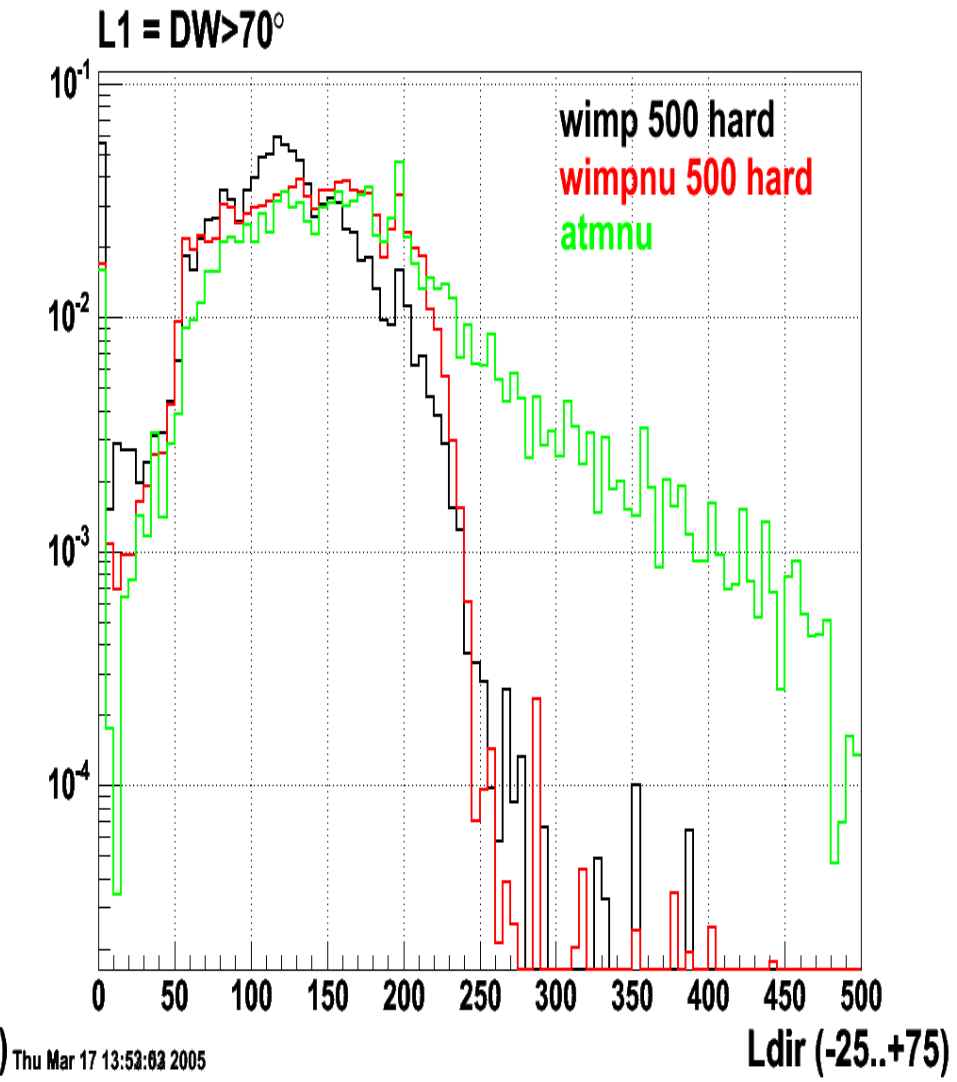
ndir


L0
wimp 500 hard
wimpnu 500 hard
atmnu
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15
20
25
ndir (-25..+75)
Thu Mar 17 13:38:09 2005


L1: DW>70°
wimp 500 hard
wimpnu 500 hard
atmnu
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15
20
25
ndir (-25..+75)
Thu Mar 17 13:37:23 2005

ldir


L0
wimp 500 hard
wimpnu 500 hard
atmnu
Ldir (-25..+75)
Thu Mar 17 13:50:00 2005


L1 = DW>70°
wimp 500 hard
wimpnu 500 hard
atmnu
Ldir (-25..+75)
Thu Mar 17 13:52:02 2005

conclusion & outlook

reweight nusim

- opens door to other dark matter analyses (e.g. KK)

wimpnu looks promising

- reconstruction-independent observables match exactly

outlook

- understand/solve reco-dependent discrepancies
- ANIS
- does Zeuthen 00-03 L3 kill my signal?