

Search for point sources using a maximum likelihood method (following) – 11/12/02

- “Hot bin” + strategy of this method (previous talk)

- “Problem” at that time: fraction of signal $s = 0 \rightarrow$ bug in the program ???

- Solution \rightarrow add artificial signal events in the center of bin 61 ($\alpha=14.73h$; $\delta=22.5^\circ$) to test if the program “sees” something

Signal events added (center of bin 61)	Fraction of signal (predicted – given by lkhd)
0	$0.17 \leftrightarrow 0.00 \pm 0.07$
5	$0.22 \leftrightarrow 0.08 \pm 0.095$
10	$0.27 \leftrightarrow 0.17 \pm 0.09$
20	$0.34 \leftrightarrow 0.31 \pm 0.085$
30	$0.40 \leftrightarrow 0.40 \pm 0.09$
40	$0.45 \leftrightarrow 0.47 \pm 0.09$

\rightarrow OK !

- Other test: put the box off the centre of bin 61

Box centered on bin 61	Box not centered	Centre of bin 61
$\alpha = 14.7125 \pm 0.1725h^*$	$\alpha = 14.72 \pm 0.2 h^*$	$\alpha = 14.73h$
$\delta = 22.2 \pm 2.6^\circ^*$	$\delta = 22.15 \pm 2.6^\circ^*$	$\delta = 22.5^\circ$

* with $s = 0.17$

- Artificial signal events in the box not centered

Signal events added (center of bin 61)	Fraction of signal (predicted – given by lkhd)
0	0.19 \leftrightarrow 0.00 \pm 0.075
5	0.24 \leftrightarrow 0.05 \pm 0.10
10	0.29 \leftrightarrow 0.15 \pm 0.12
20	0.36 \leftrightarrow 0.30 \pm 0.10
30	0.42 \leftrightarrow 0.40 \pm 0.10
40	0.47 \leftrightarrow 0.50 \pm 0.10

→ OK !

- Conclusion
 - no bug in the program
 - the signal in the “hot bin” is not significant