Observation modi for Cherenkov Telescopes, focussing on MAGIC

IMPRS Seminar

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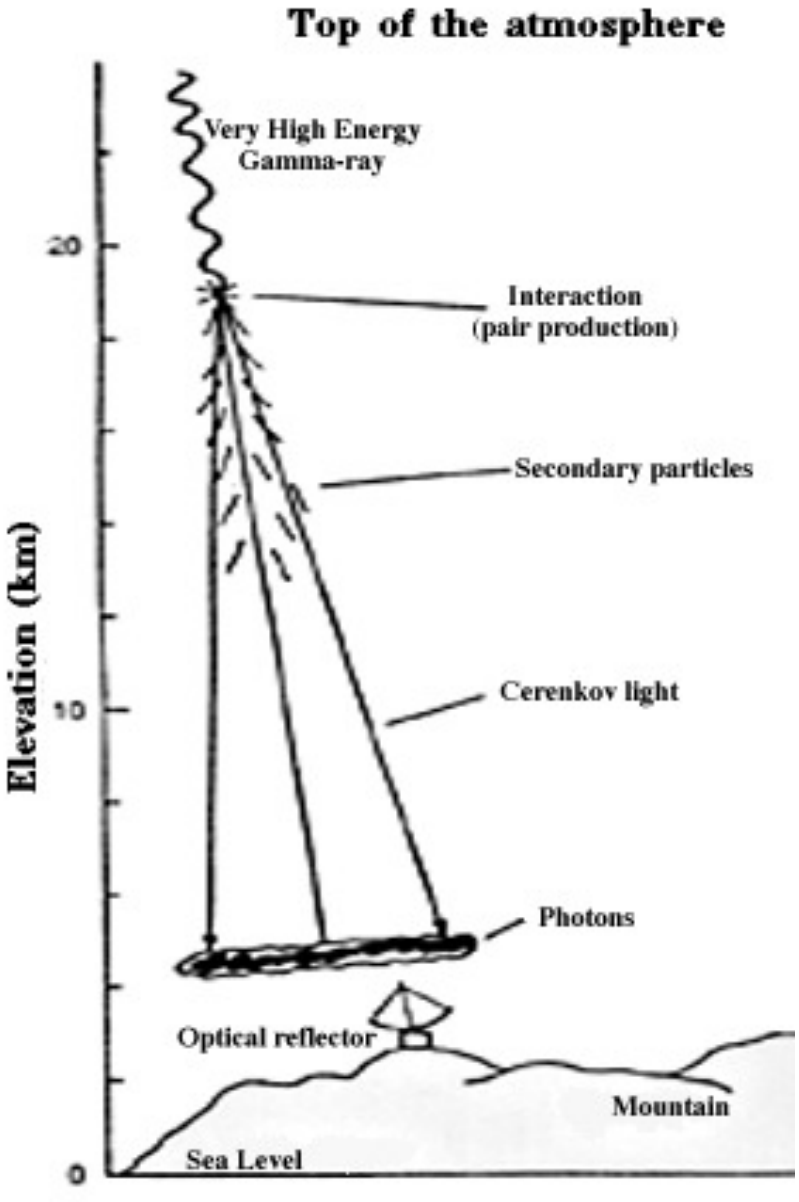
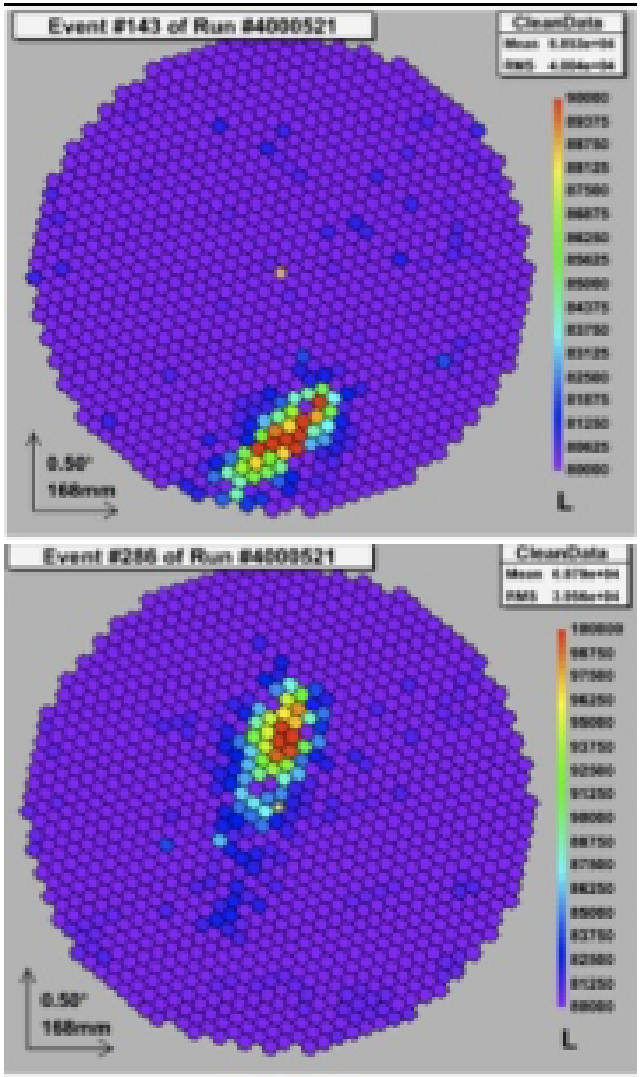
Outline

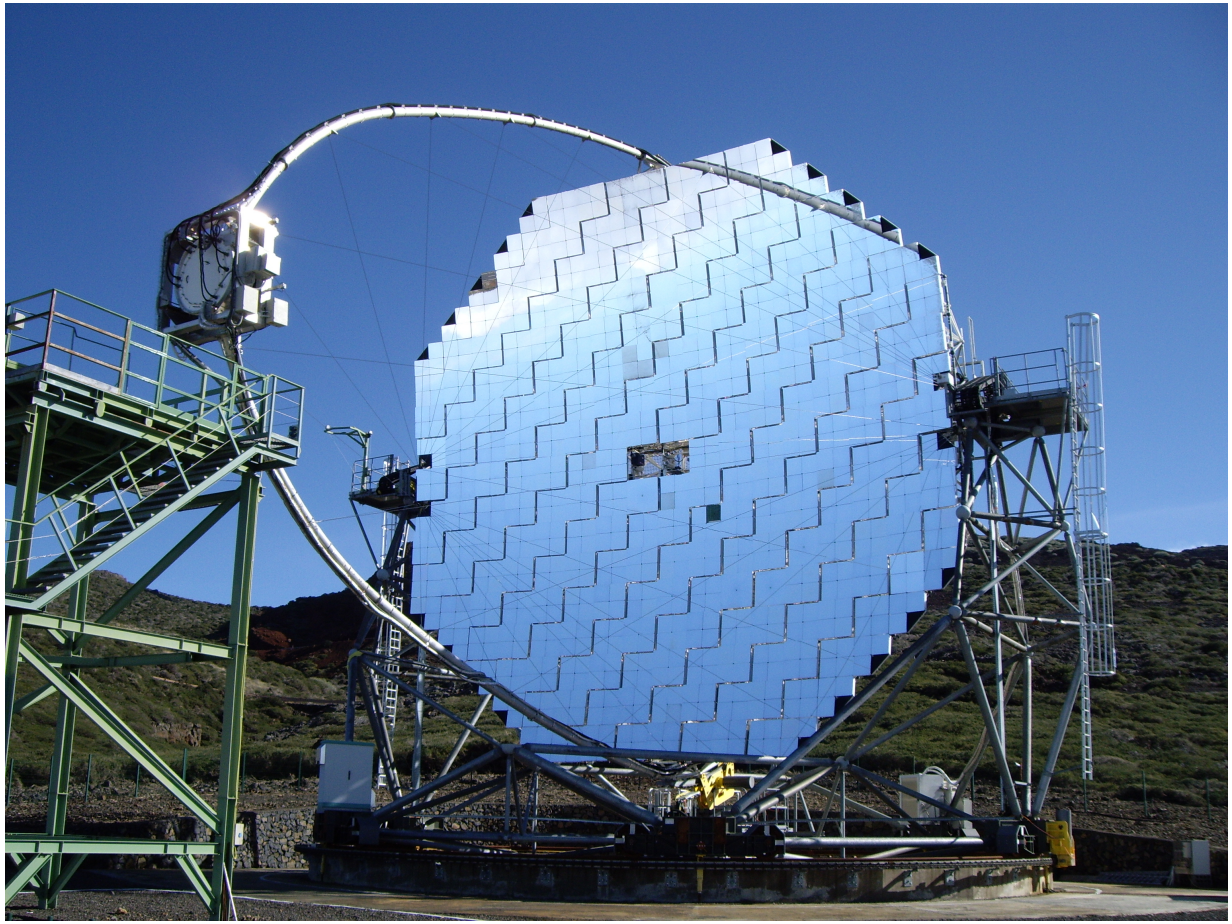
Major **A**tmospheric **G**amma **I**maging **C**herenkov Telescopes

Imaging Cherenkov Technique





Mono Observations



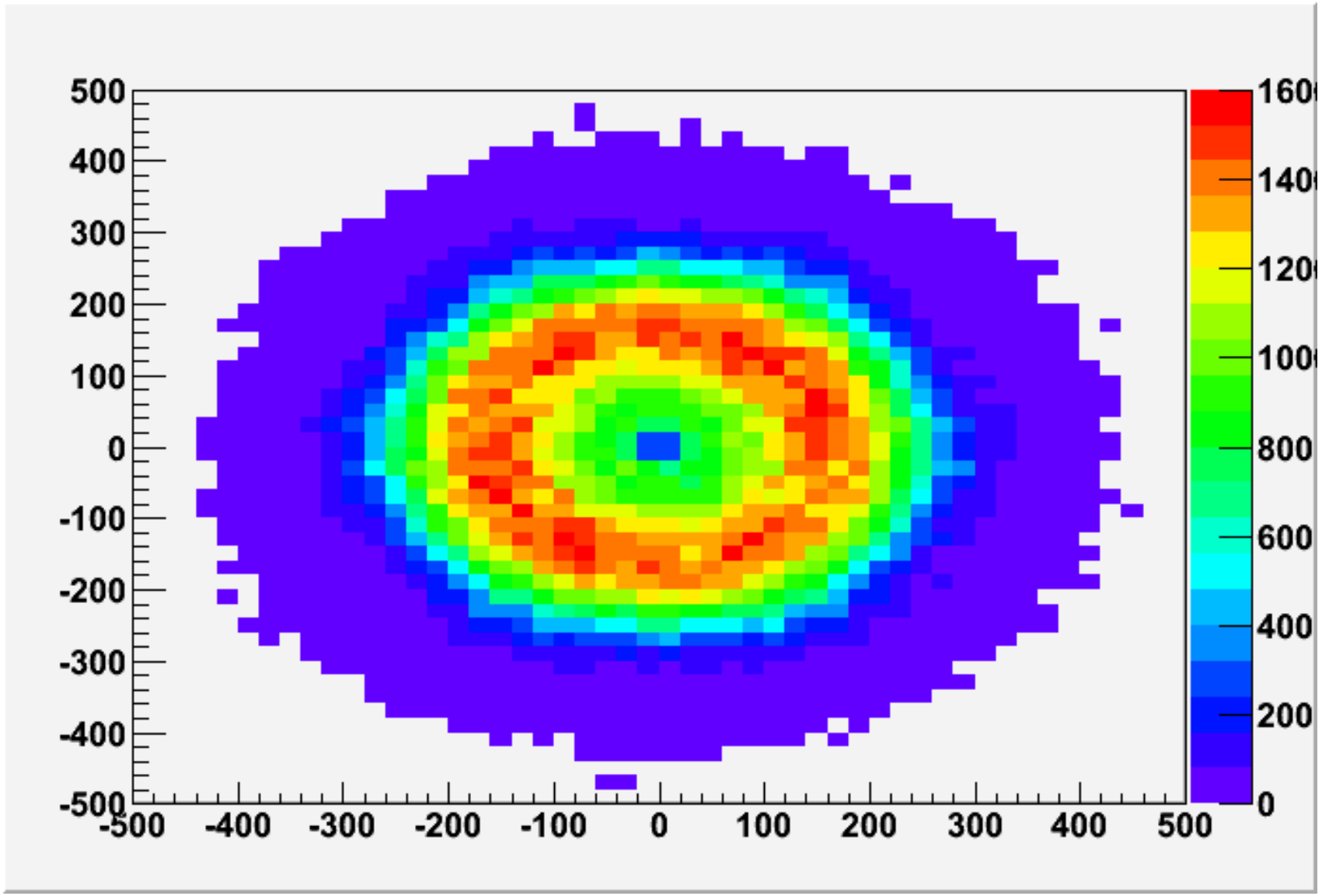
PRO

- cheaper!
- symmetry in Azimuth

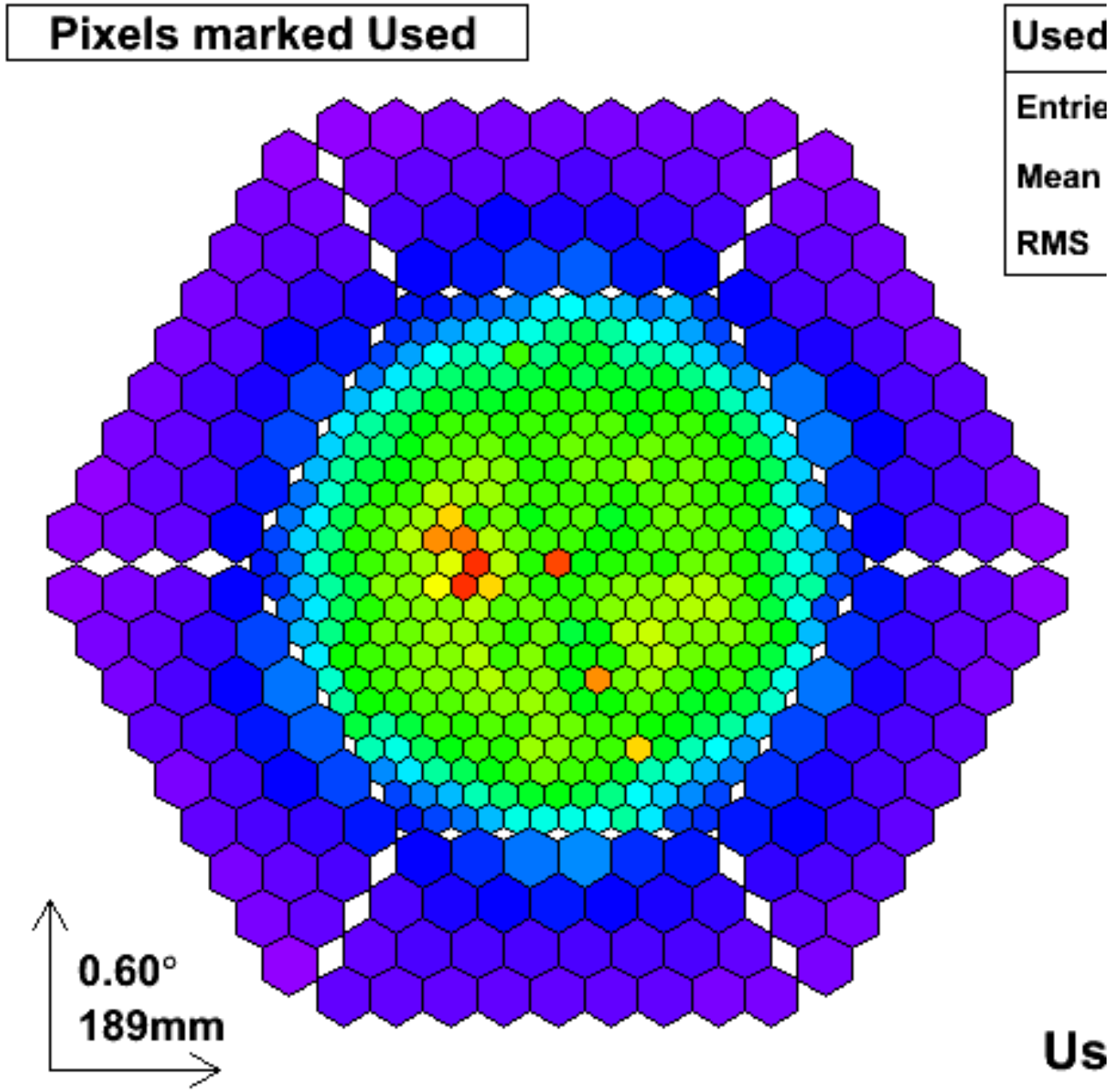
CONTRA

- difficult to reject background
- no precise 3d information

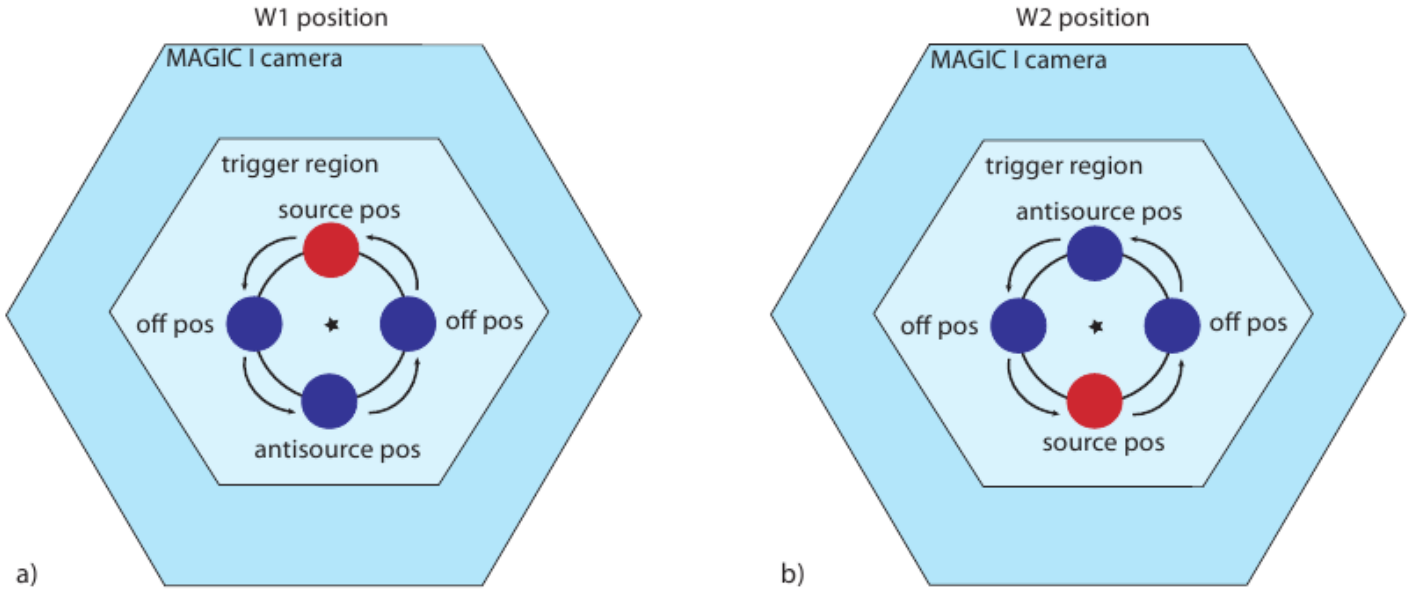
Center of Gravity [CoG] (Simulation of a source)



CoG from observations (source+background)



ON/OFF Observations vs. Wobble Observations



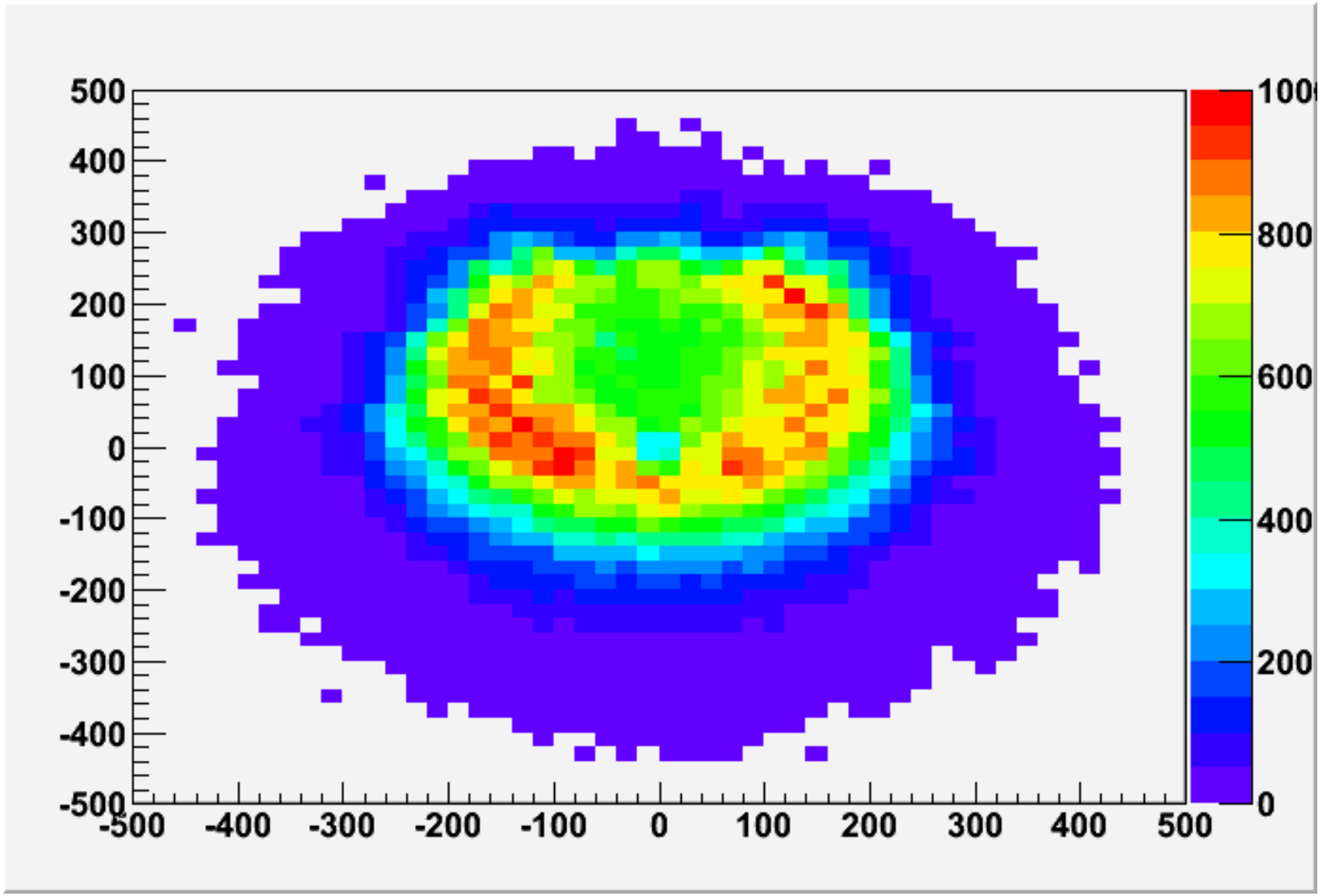
ON/OFF

- best coverage of trigger
- needs dedicated OFF
- ON and OFF measurments can differ by systematics

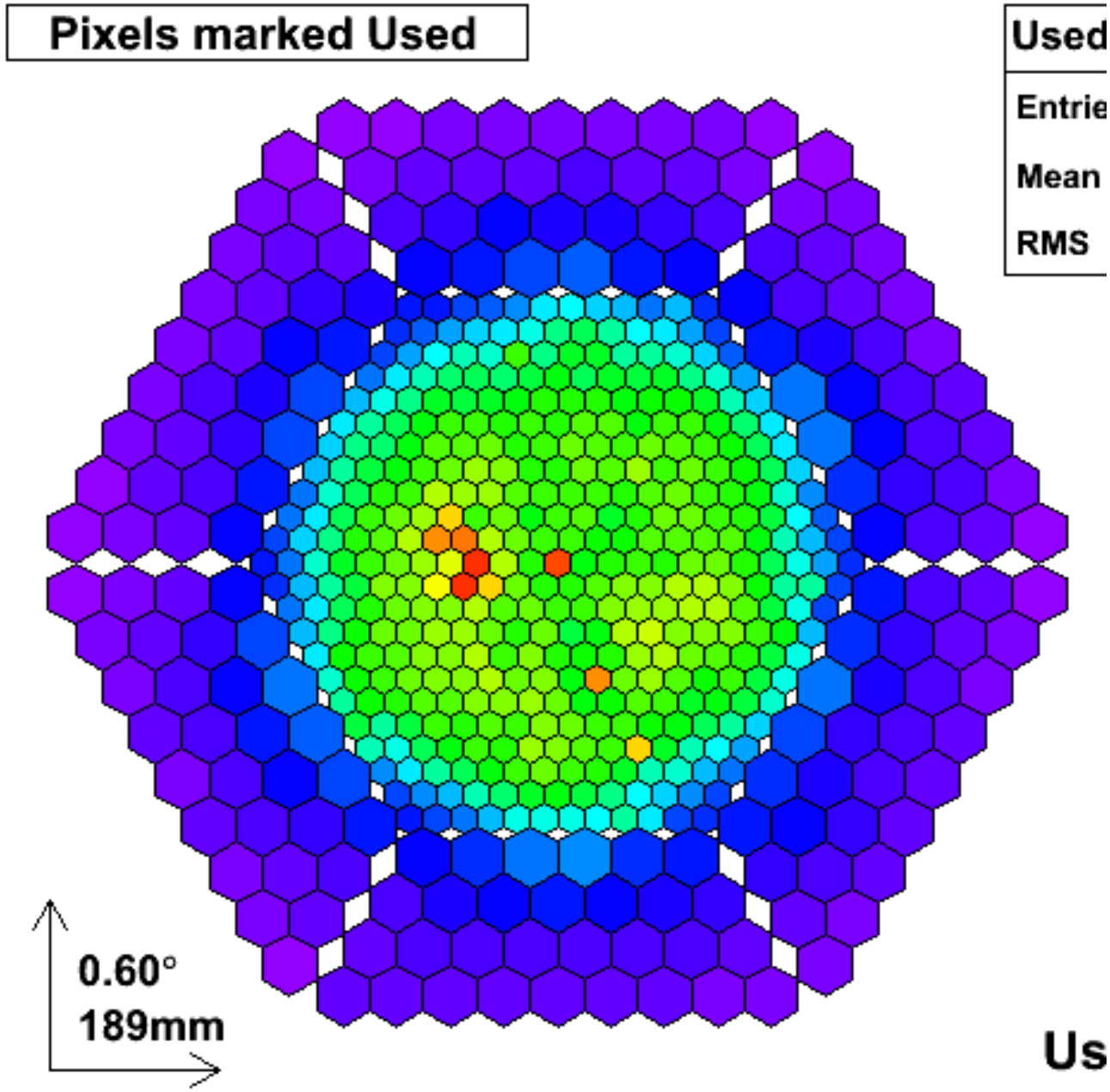
Wobble

- worse coverage of trigger
- needs no dedicated OFF
- interchange of wobble positions reduce systematics

CoG for wobble (Simulation of a source)



CoG for wobble (real data)



Stereo Observations

PRO

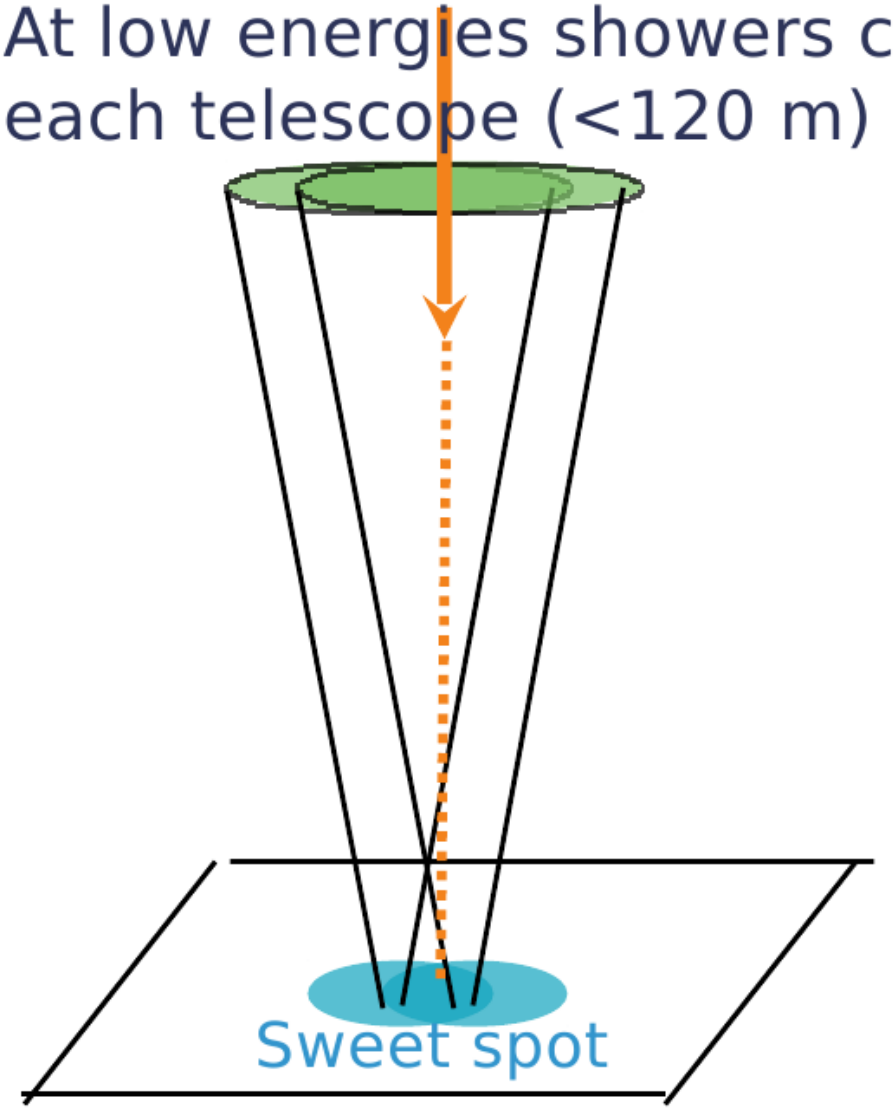
- Good 3d information
- better background rejection

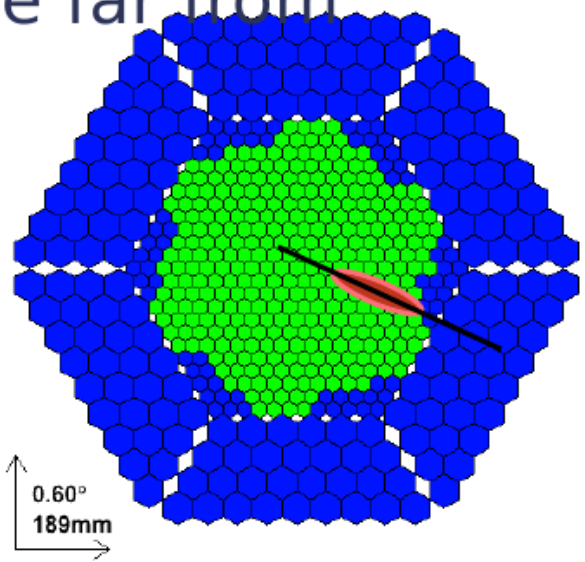
CONTRA

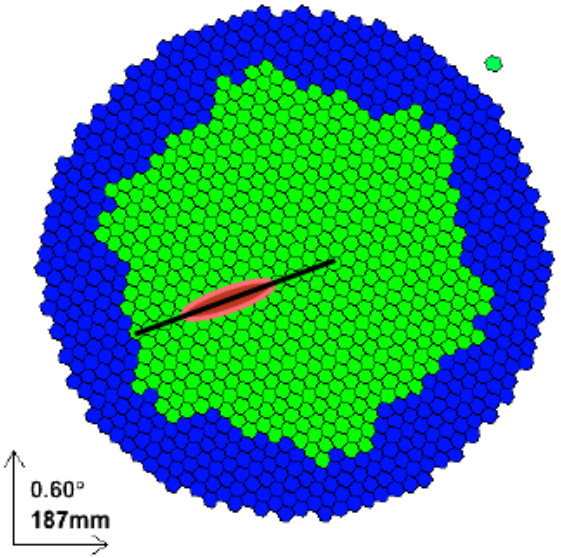
- no symmetry in Azimuth
- more Systems

The L3 Blob

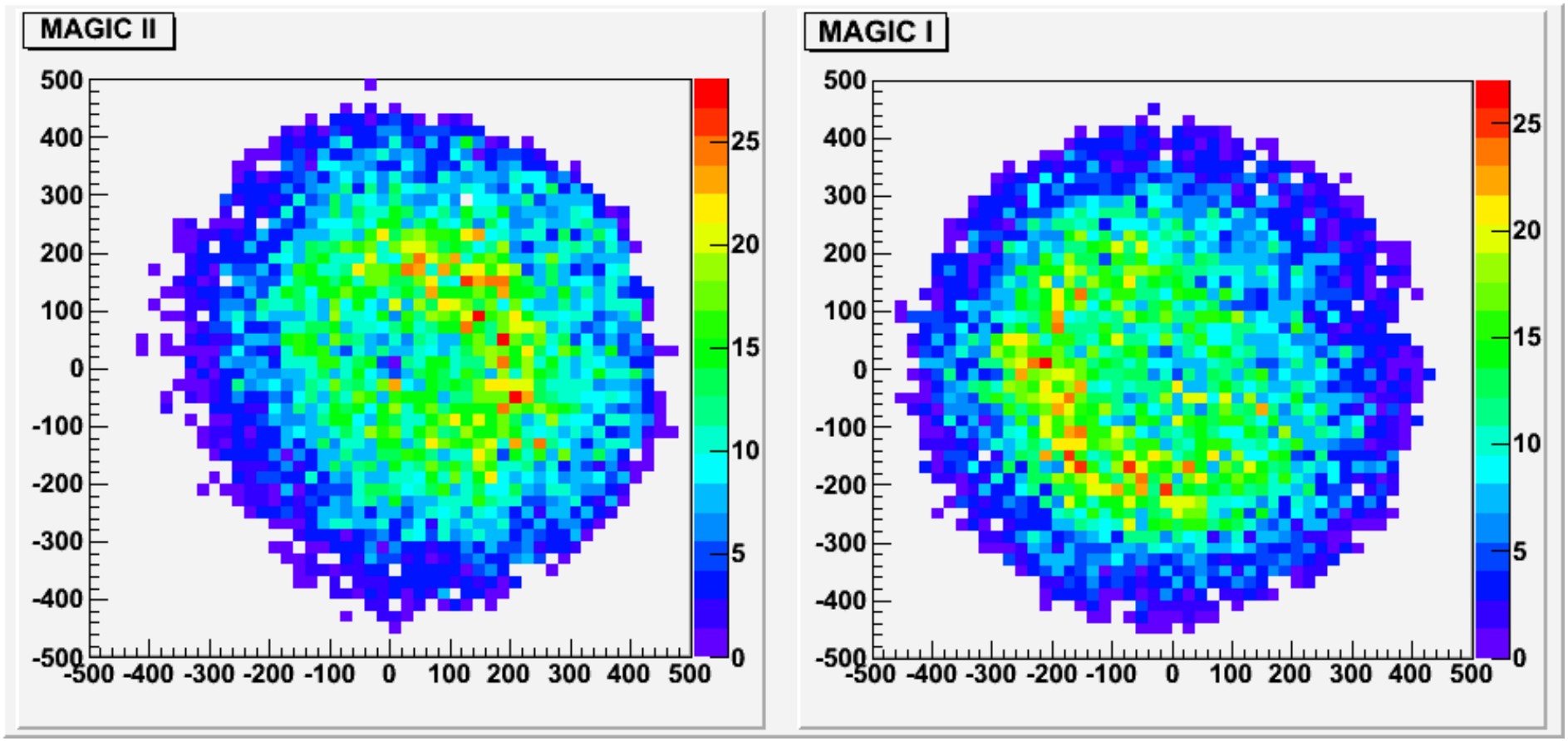
- At low energies showers can not be far from each telescope (<120 m)



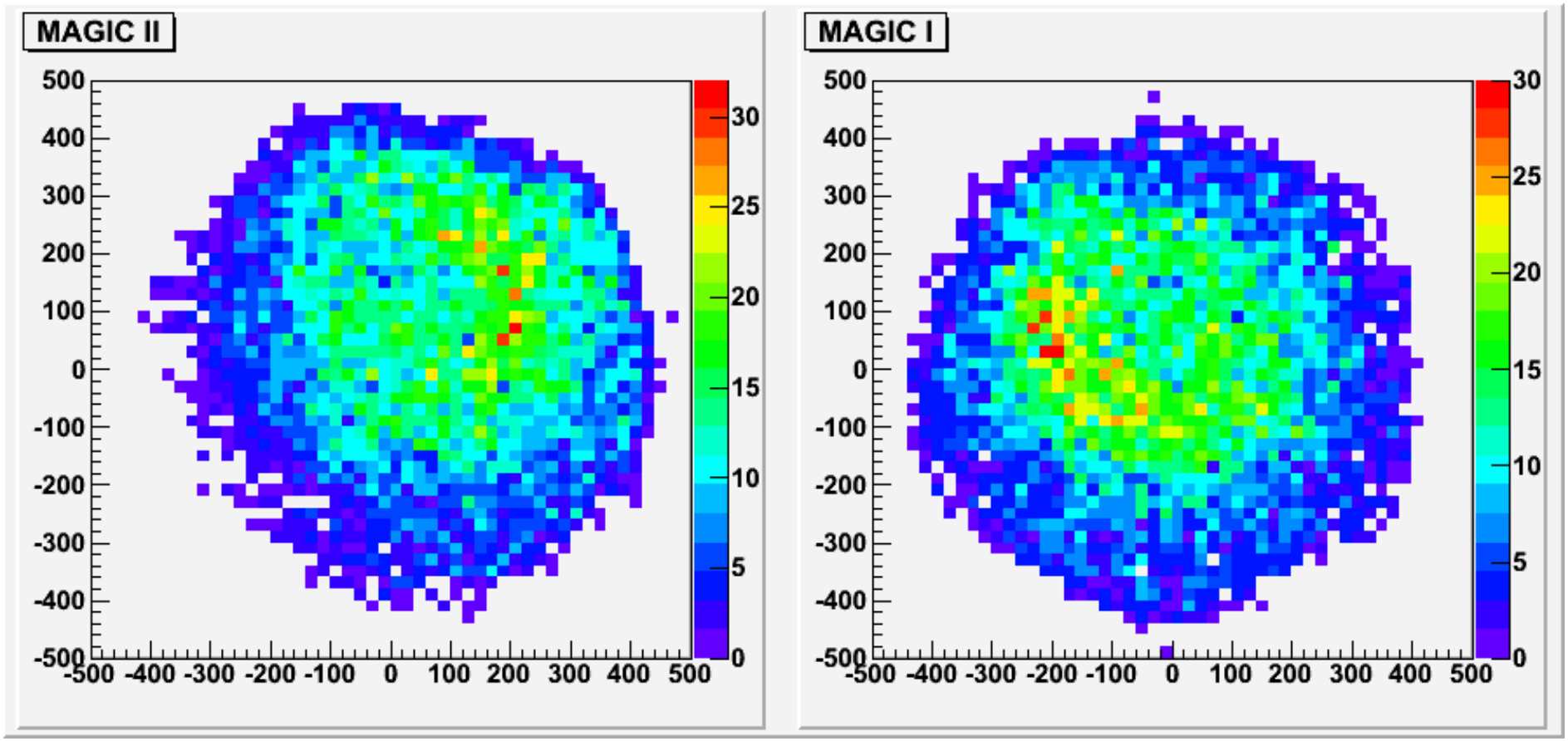




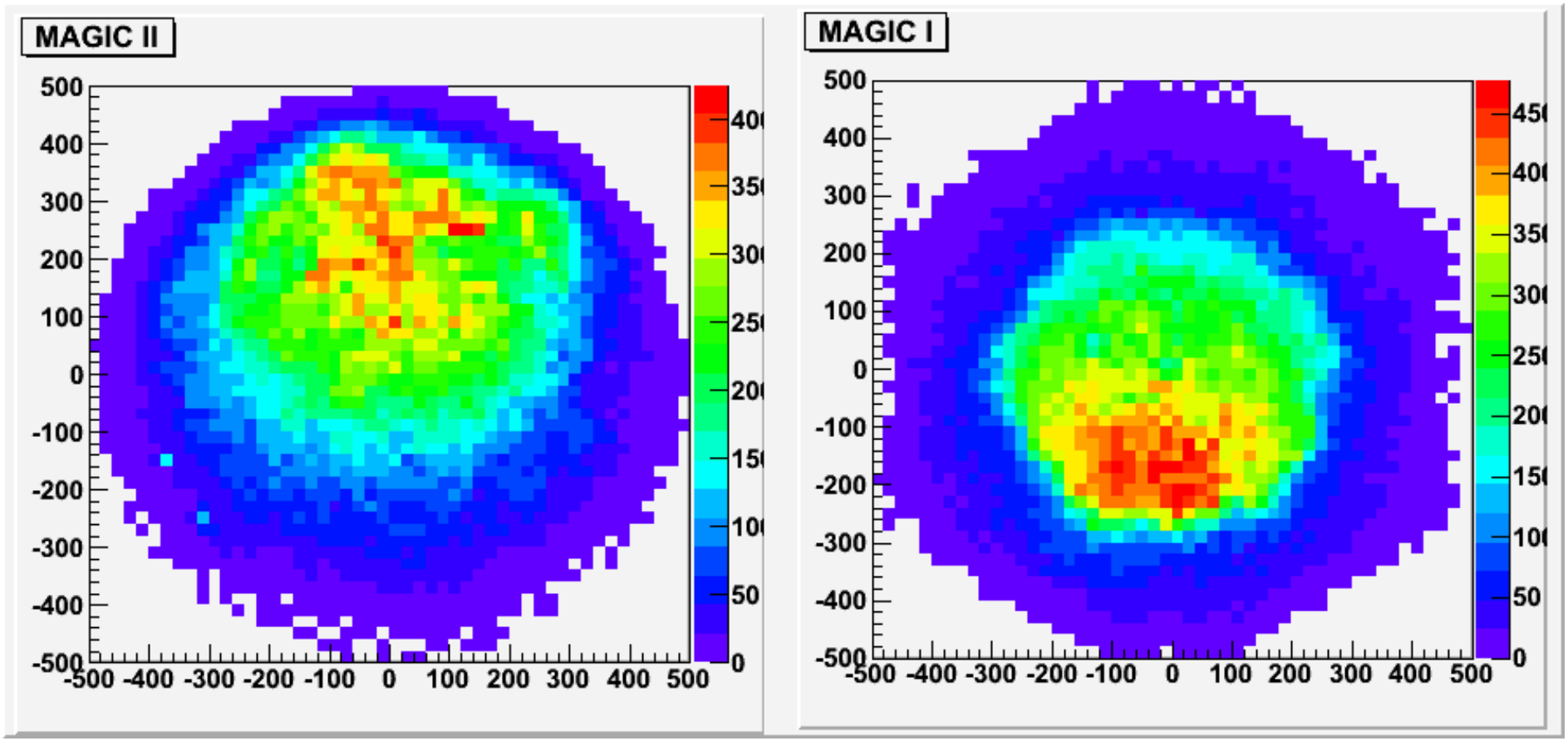
CoG for stereo ON (Simulation of a source)



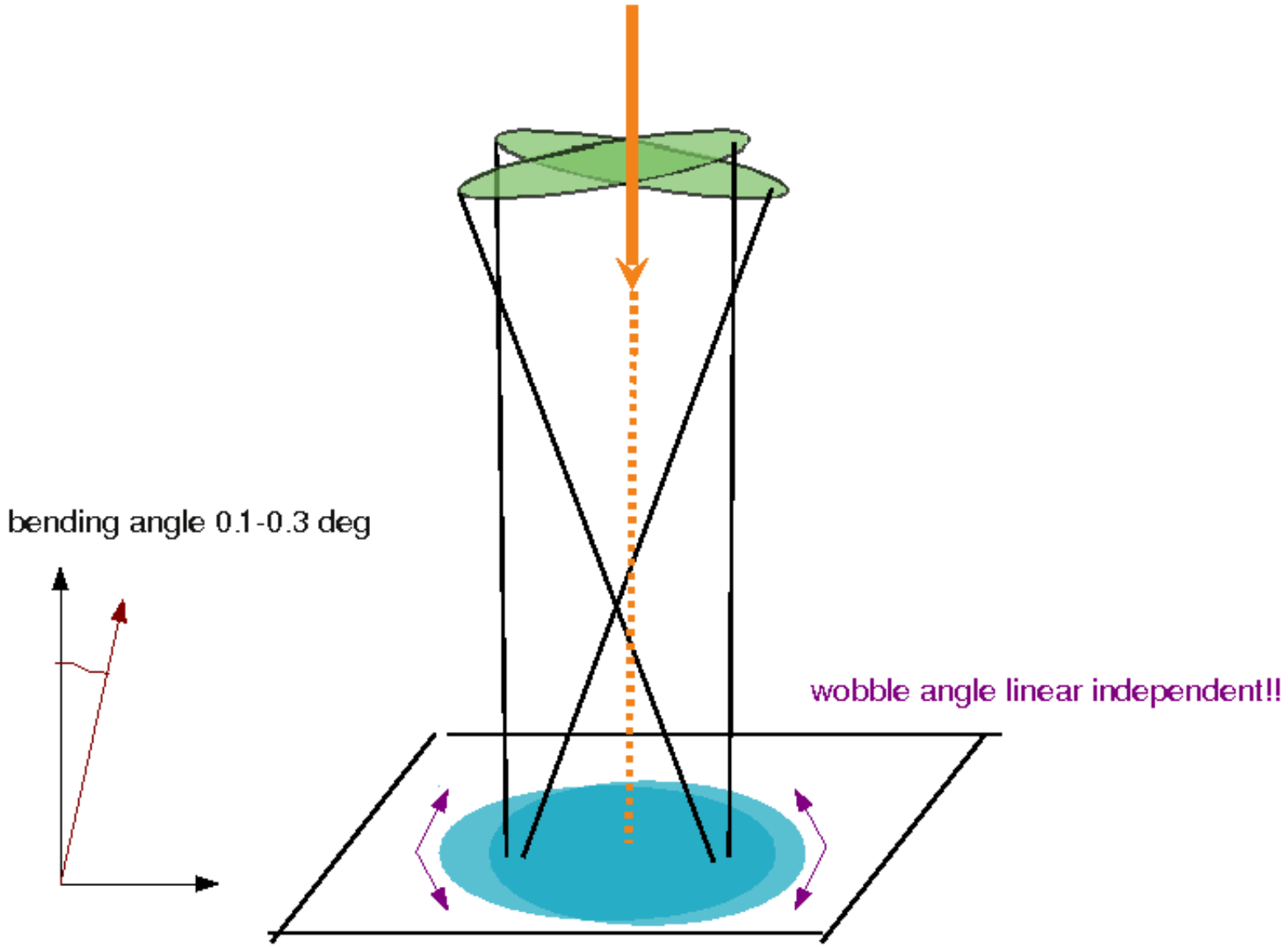
CoG for stereo wobble (Simulation of a source)



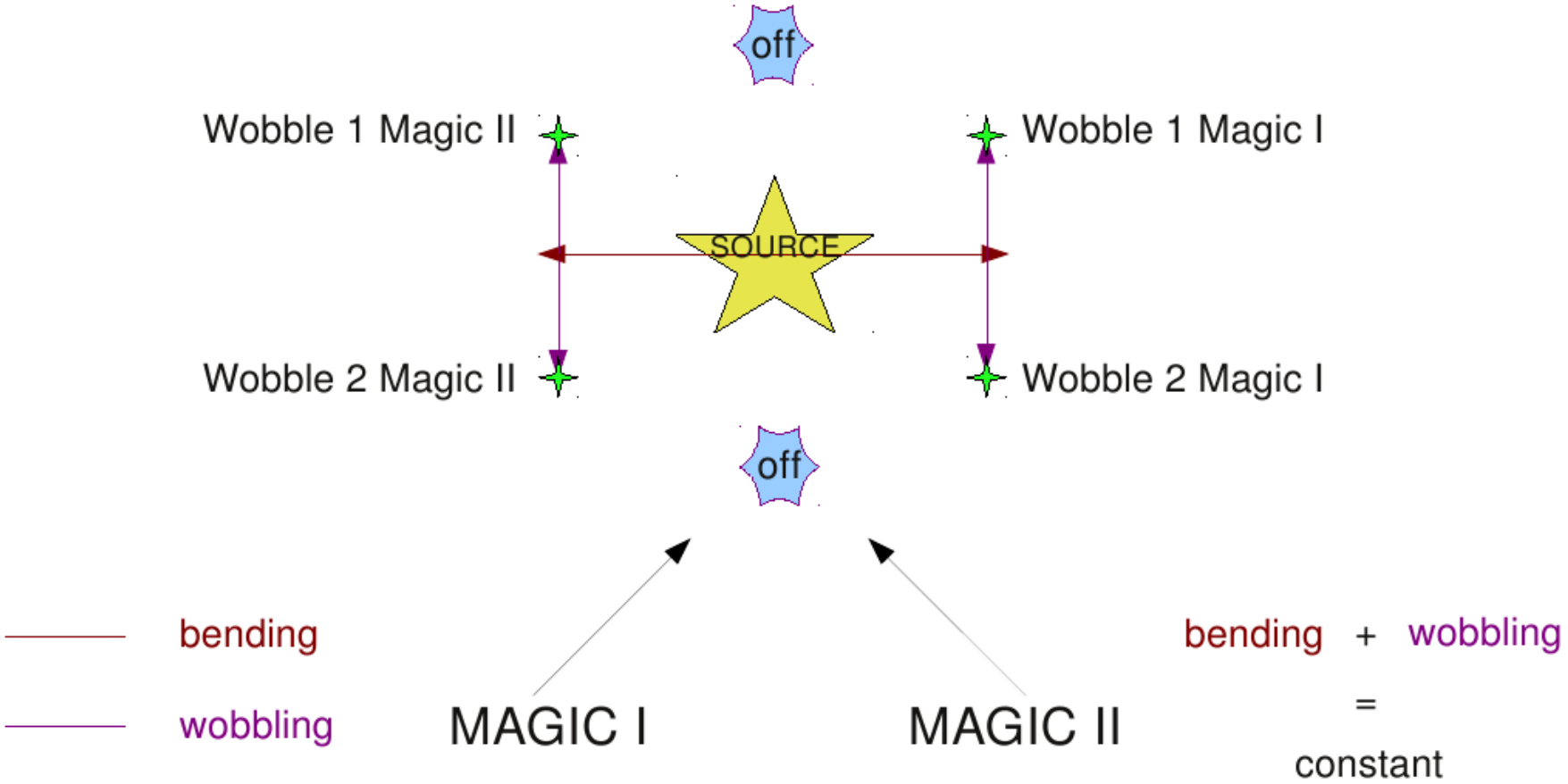
CoG for stereo (1 Wobble position of real data)



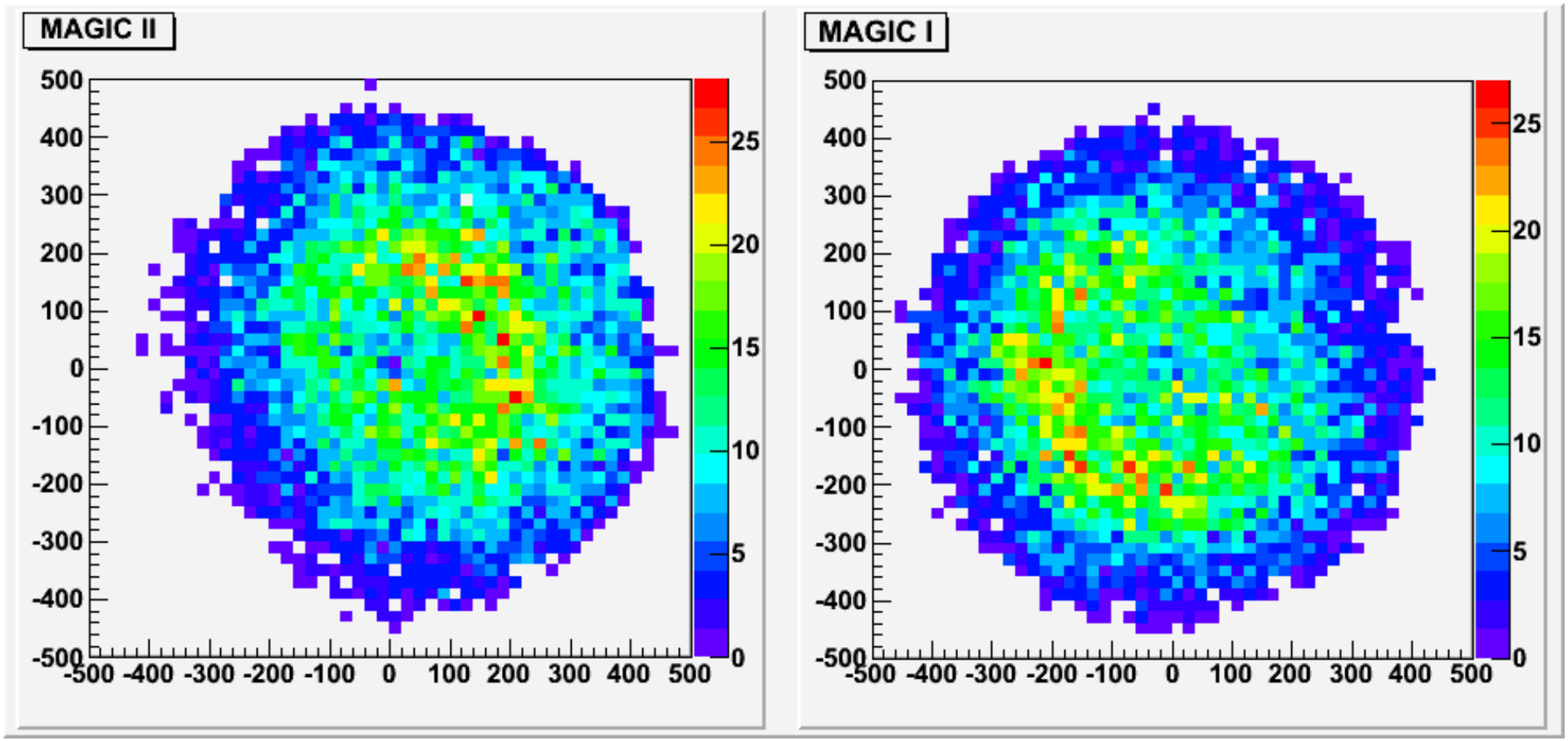
Convergent Mode



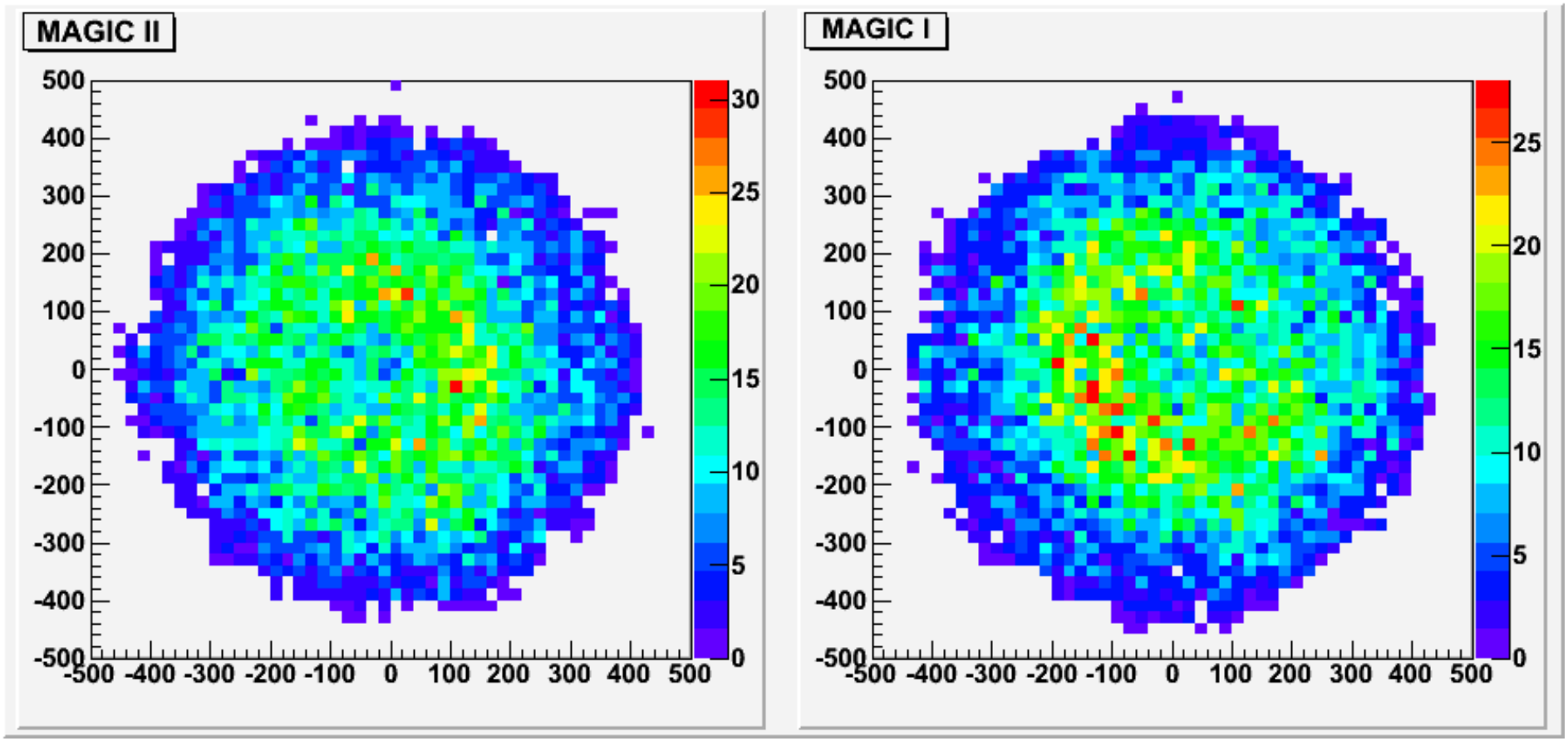
Convergent Wobble



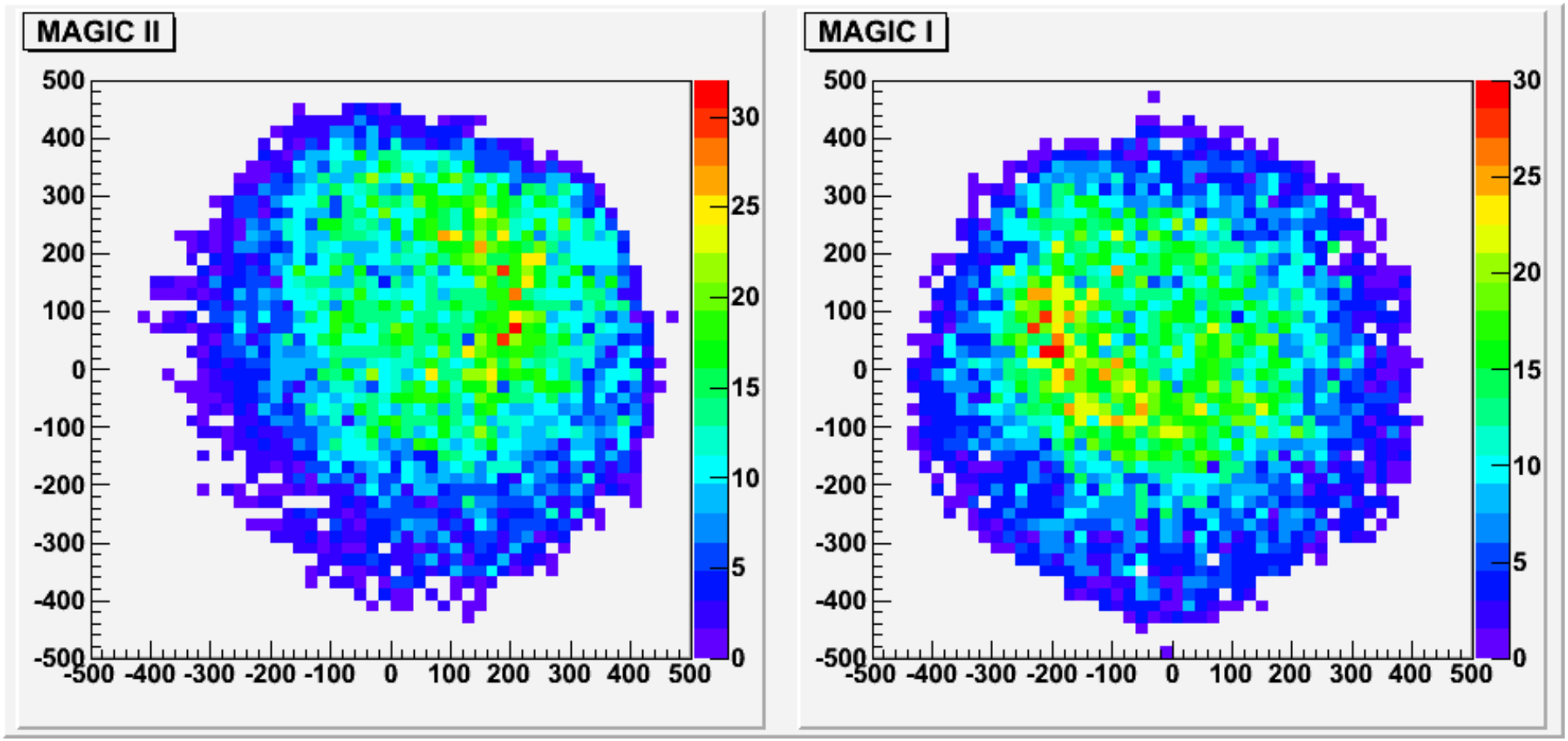
CoG for stereo ON (Simulation of a source)



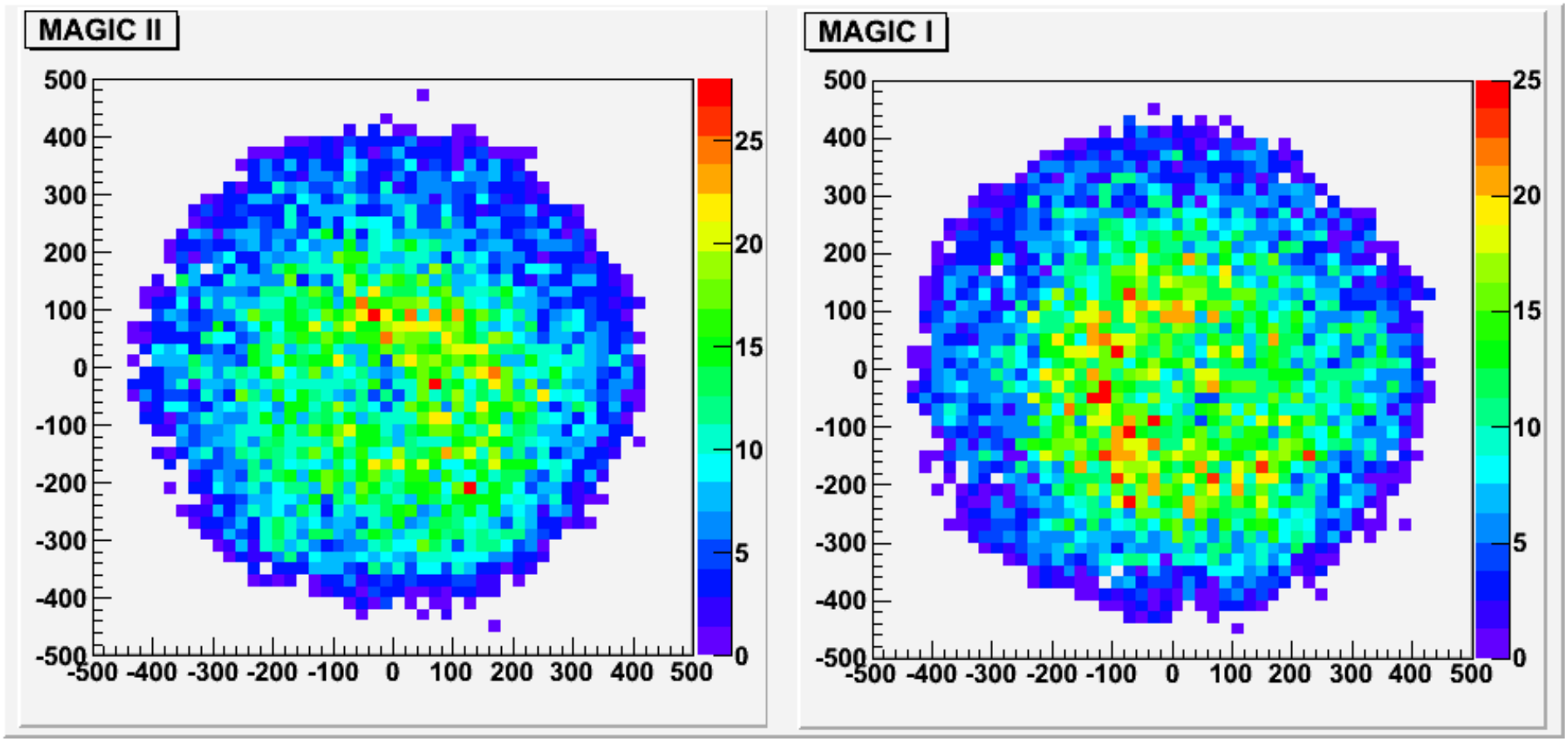
CoG for stereo convergent ON (Simulation)



CoG for stereo wobble (Simulation of a source)



CoG for stereo convergent wobble (Simulation)



MAGIC vs. HESS/VERITAS

Why does VERITAS or HESS do not use the convergent mode?

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They can not!

4 Telescopes are too much to use convergent wobble

MAGIC vs. HESS/VERITAS

Why does VERITAS or HESS do not use the convergent mode?

They can not!

4 Telescopes are too much to use convergent wobble

They do not need it...

4 Telescopes produce bigger overlap in normal mode
Their trigger region covers the hole camera

Conclusion

Done so far

- test of feasibility
- first simulation show up to 25% improvement in the gamma efficiency

To do

- more advanced simulations
- background (hadrons) simulations
- effect after the hole analysis chain
- change in the drive systems
- real test on crab

Germany's Fortune ?!

Year	1962	1966	1970	1974
placing	7	2	3	1
year	1998	2002	2006	2010
placing	7	2	3	***?***