

Discussion : « calibrations »

Useful « fake » Signals

- ANTARES/KM3NeT/IceCube :
 - LED beacons : relative timing between OMs in same line
 - Laser beacon : relative timing inter-lines
 - Internal LEDs : stability of PMT transit times
- Naive question from an outsider : Radio beacons ?

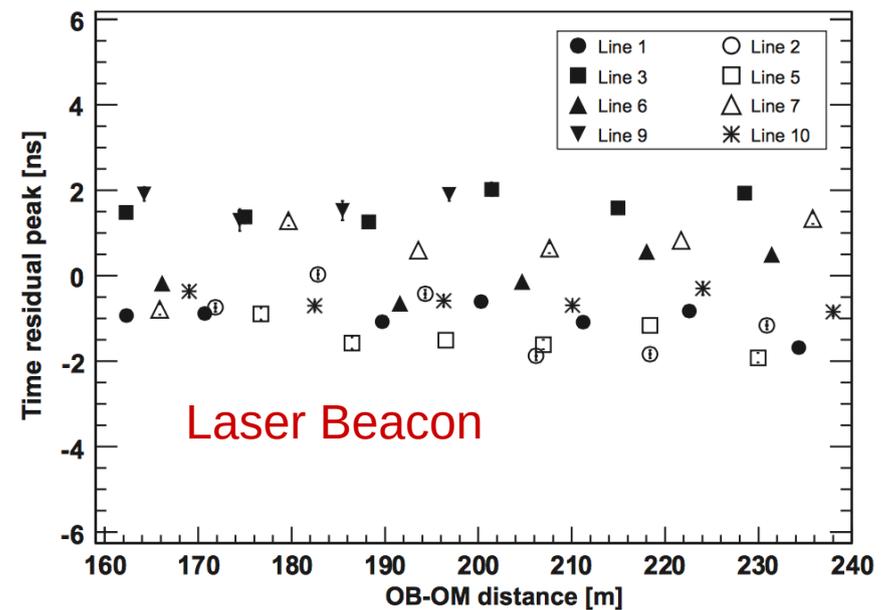
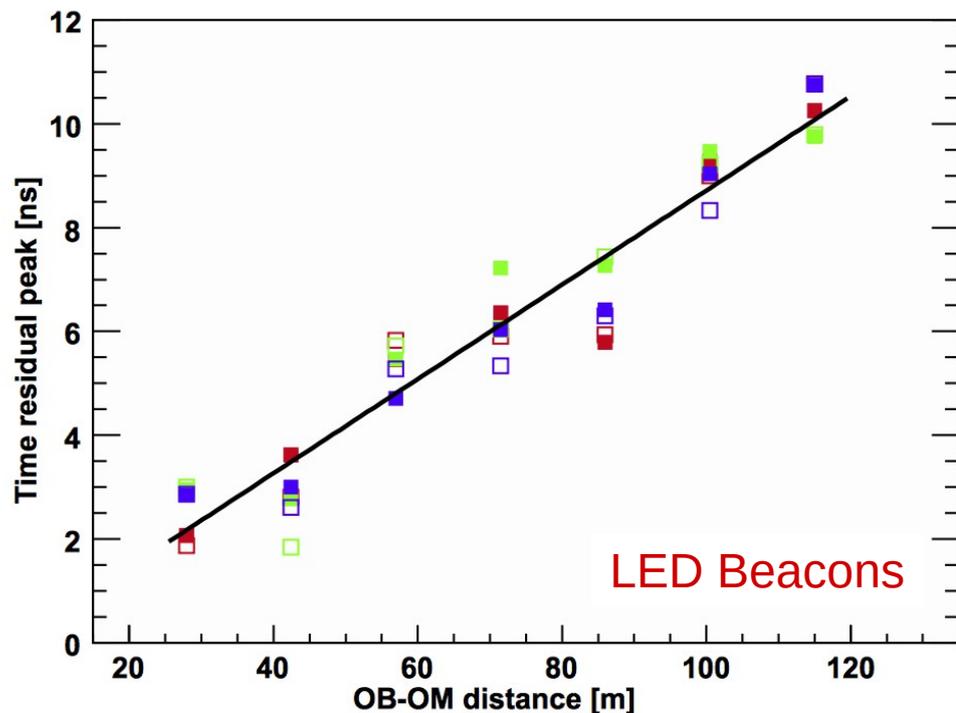
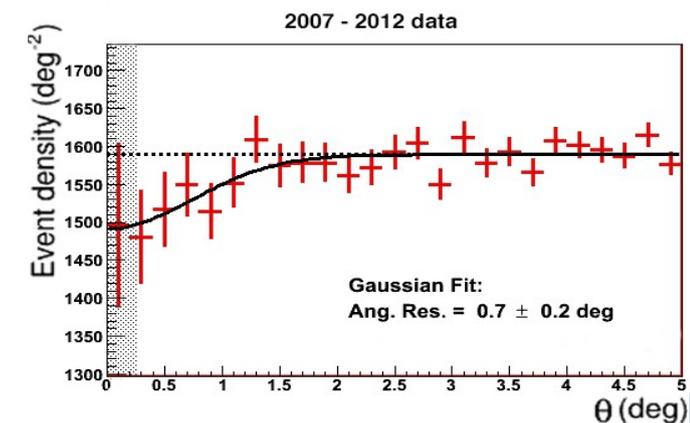
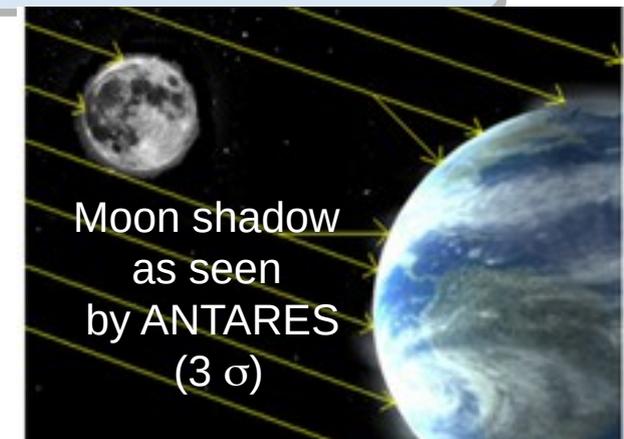
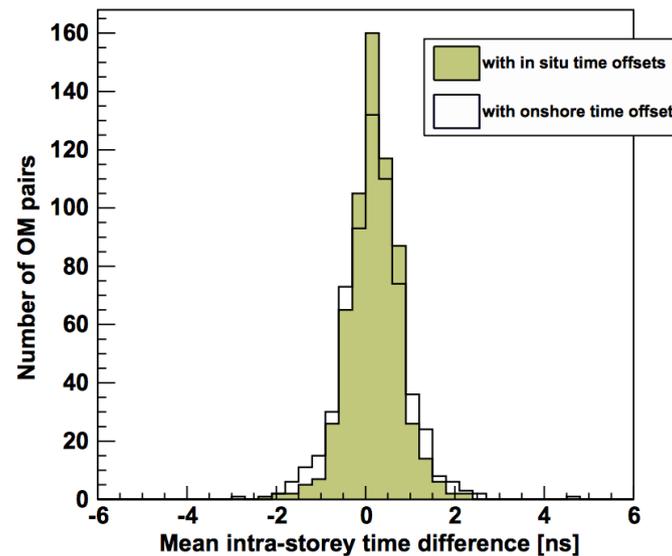
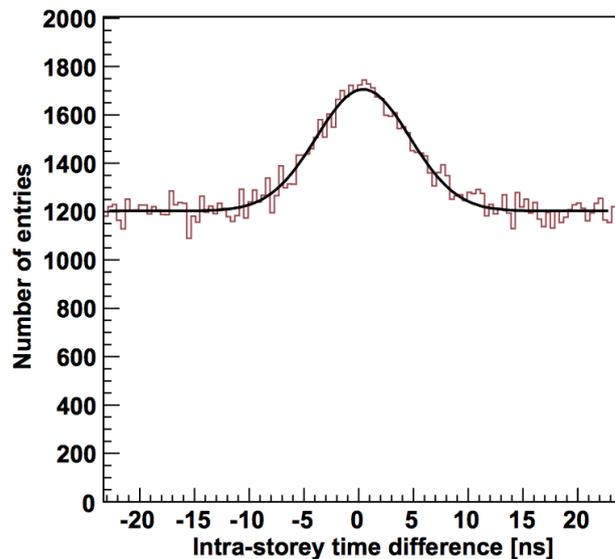


Fig. 15. Time residual peak position versus the distance between the laser beacon and the OM. Each point is the average over all the OMs in the same storey.

Discussion : « calibrations »

Useful Physical Signals

- ANTARES/KM3NeT/IceCube :
 - K40 for Optical Module knowledge
 - Atmospheric (downgoing) muons – moon shadow
- ➔ Naive question from an outsider : calibration signals for GRAND ?
- ➔ Regular Showers ?



Discussion : « calibrations »

Useful Physical Signals

- ANTARES/KM3NeT/IceCube :
 - Atmospheric muons/neutrinos
- Naive question from an outsider : How to « check » GRAND ?

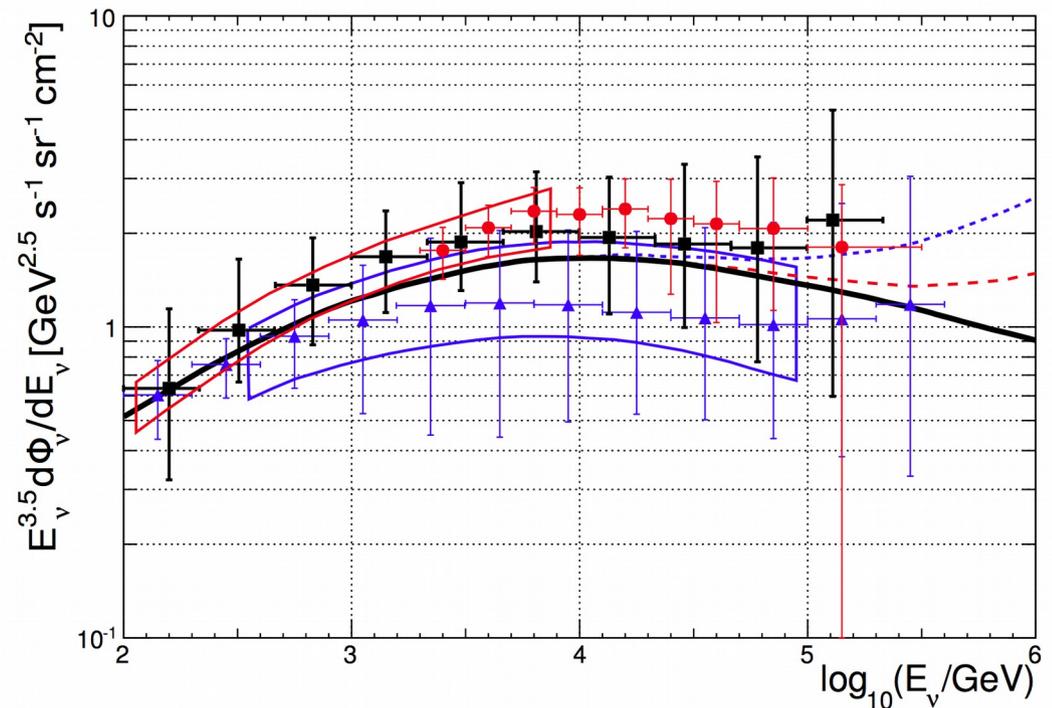
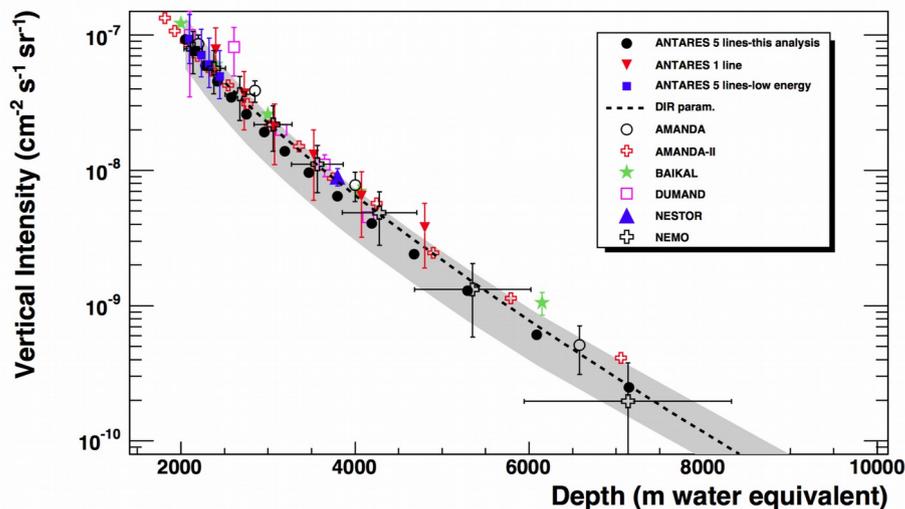
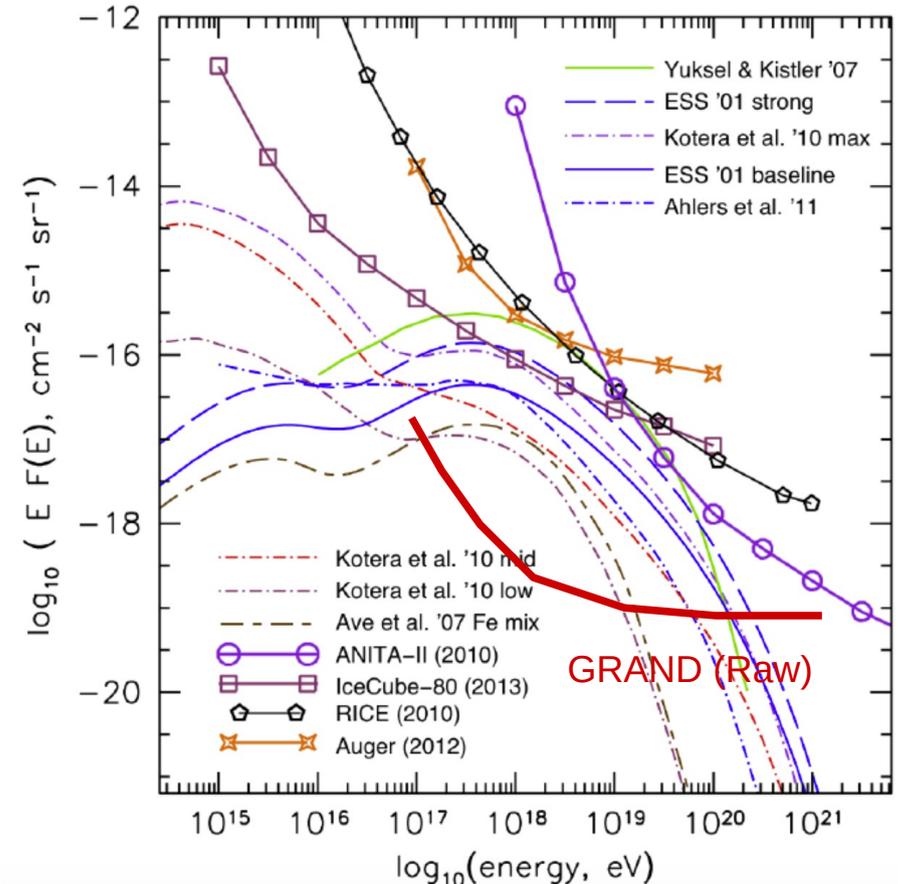
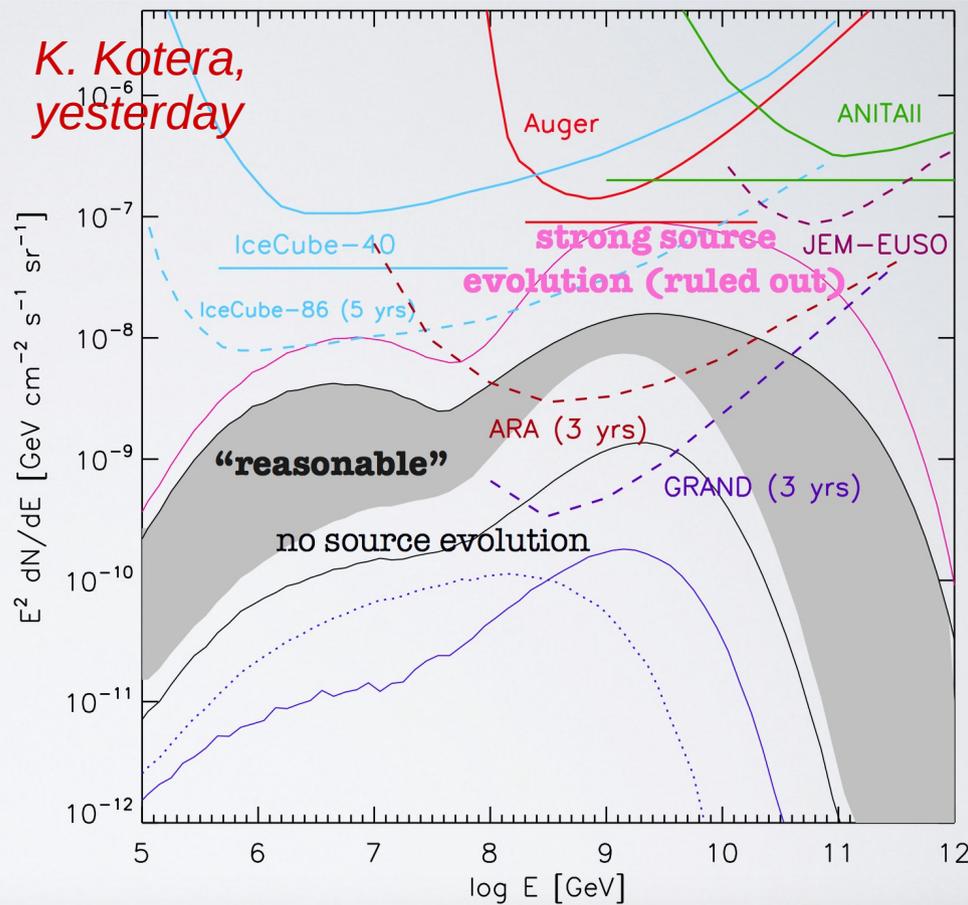


Figure 7: The atmospheric neutrino energy spectrum $E_\nu^{3.5} d\Phi_\nu/dE_\nu$ measured in this work in the zenith angle region $\theta > 90^\circ$ (black full squares). The full line represents the ν_μ flux from Ref. [20]. The red and blue dashed lines include two prompt neutrino production models from Ref. [24] and Ref. [25], respectively. All theoretical expectations are zenith-averaged from 90° to 180° . The result of the AMANDA-II unfolding [12] averaged in the region 100° to 180° is shown with red circles and that of IceCube40 [13] zenith-averaged from 97° to 180° is shown with blue triangles. The red region corresponds to the ν_μ measurement from Ref. [11], and the blue one to the IC40 update from Ref. [49].

Discussion : cross-checks with other detectors

Energy Ranges

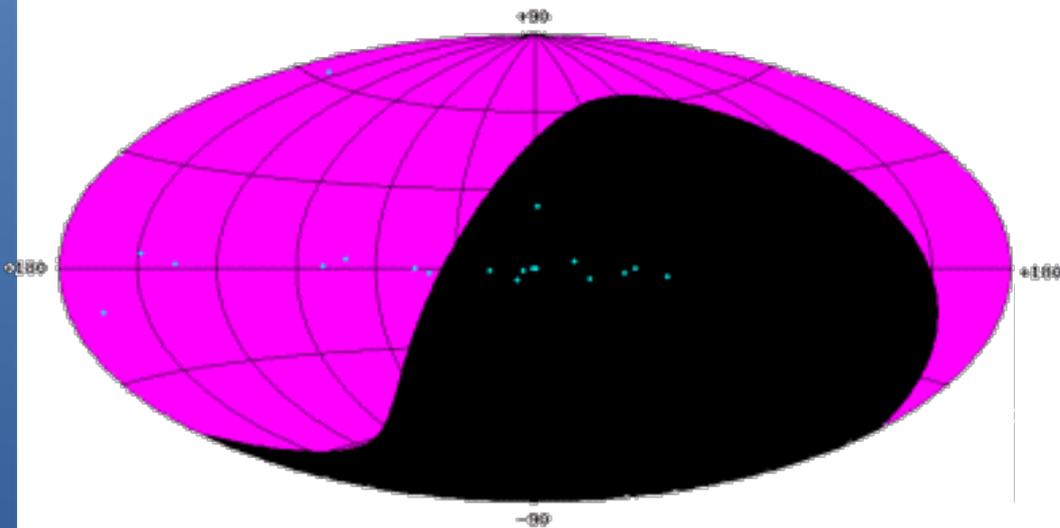
- ANTARES/KM3NeT/IceCube : up to EeV
 → **Possible Cross-checks ?**



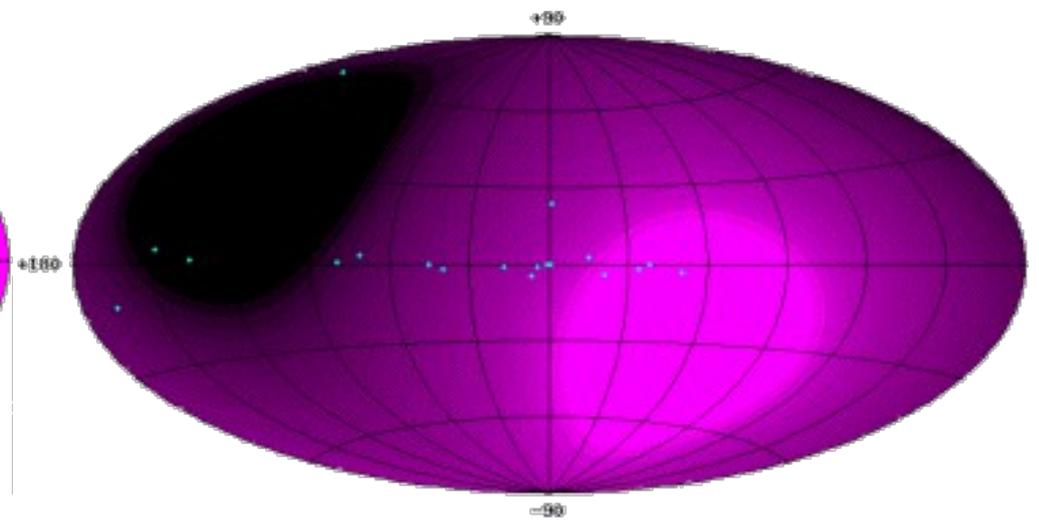
Discussion : common observations ?

Sky coverage

- ANTARES/KM3NeT : Northern Hemisphere for $> E_{\text{eV}}$
- IceCube : Southern Hemisphere for $> E_{\text{eV}}$
- Full sky coverage with both IceCube + KM3NeT



From South Pole – upgoing ($< \text{PeV}$)
Southern hemisphere for E_{eV}

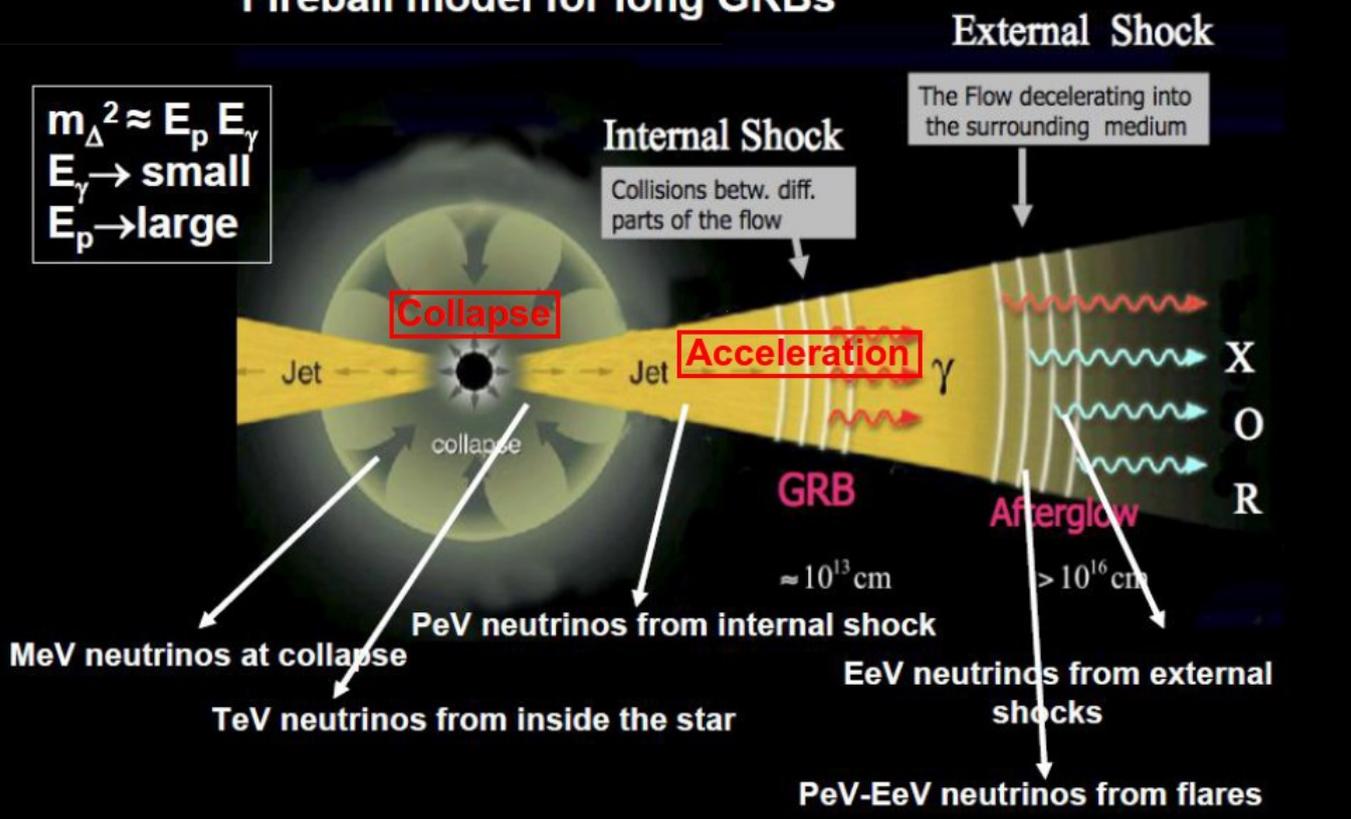


From Mediterranean (45°) – upgoing ($< \text{PeV}$)
Northern Hemisphere for E_{eV}

Discussion : Correlations/coincidences ?

GRBs as neutrino sources

Fireball model for long GRBs



Ando&Beacom

GRBs for real-time coincidences ?

- ANTARES/KM3NeT/IceCube for GeV-PeV
- GRAND $> \text{EeV}$
- Virgo/LIGO for collapse phase
→ Δt with EeV neutrinos ?

Long GRB Neutrinos

- Precursor : 10-100s, TeV
- Internal shocks : T90, PeV
- Afterglows/X : 10^3 s, EeV
- For Antares+Ligo/Virgo
→ ± 500 s