Atmospheric μ data vs MC with KM3NeT detectors & prompt μ analysis

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on behalf of the KM3NeT Collaboration

Flash talk

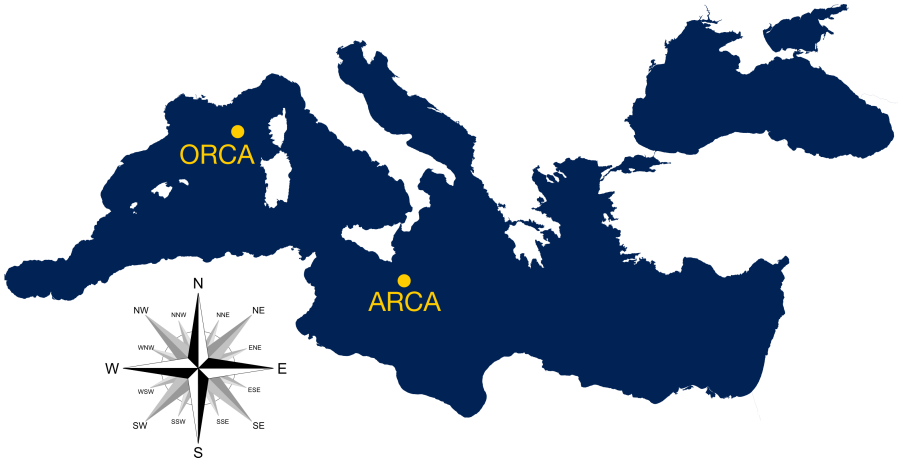
Poster #210

KM3NeT

NATIONAL CENTRE FOR NUCLEAR RESEARCH ŚWIERK

KM3NeT basics

KM3NeT – km^3 Neutrino Telescope(s)

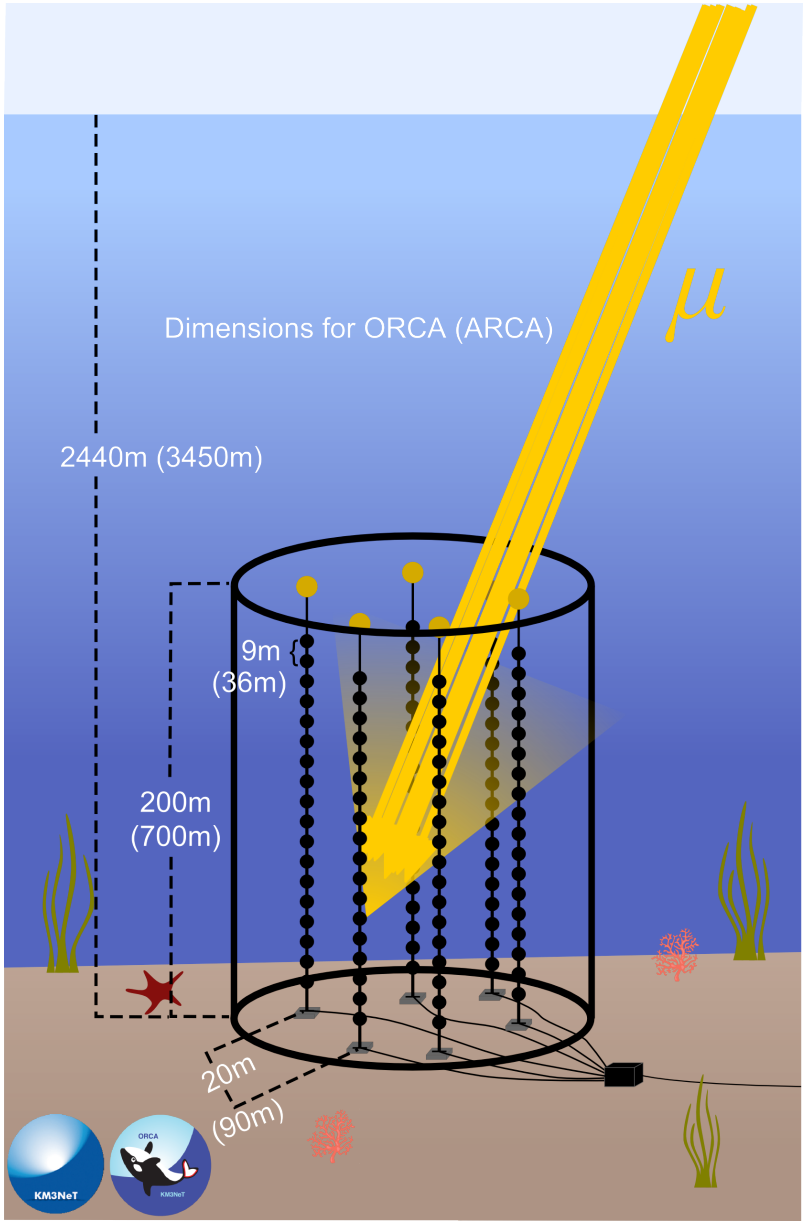


Detection Unit (**DU**): string with 18 DOMs

Example: ORCA4 has 4 DUs

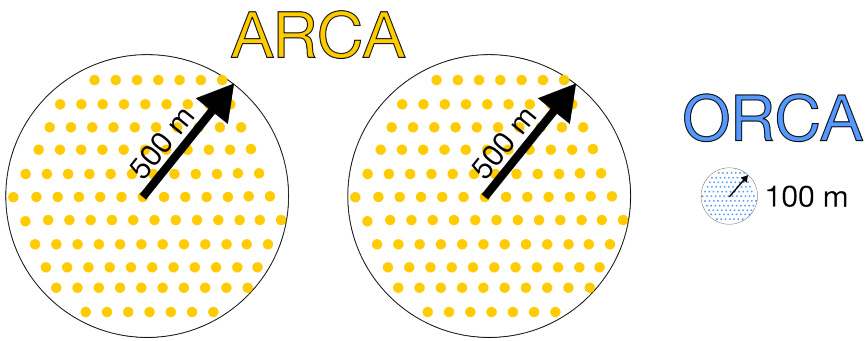
Digital Optical Module (**DOM**)
(31 PMTs + electronics etc.)

KM3NeT detectors



ORCA: Oscillation Research with Cosmics in the Abyss
(main goal: m_ν hierarchy)

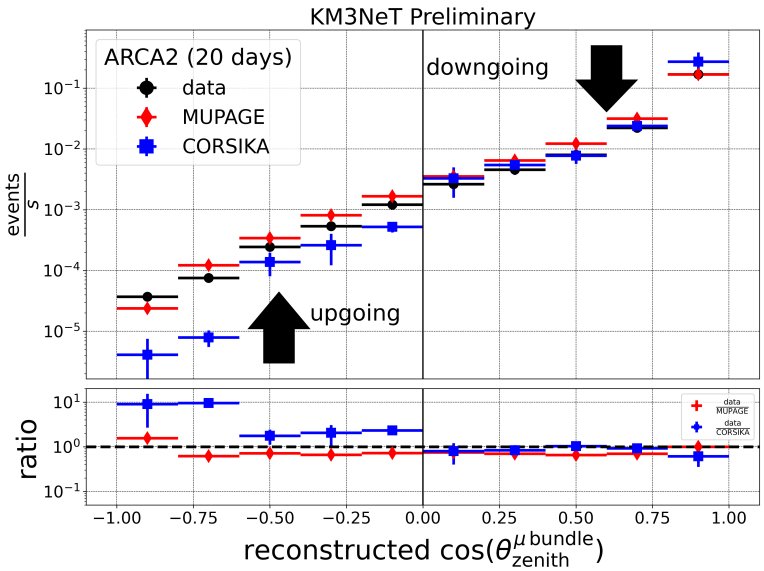
	ARCA	ORCA
Depth	3.5 km	2.5 km
Volume	1 km3 (1 Gton)	0.007 km3 (7 Mton)
#DU	6 / 2x115	6 / 115

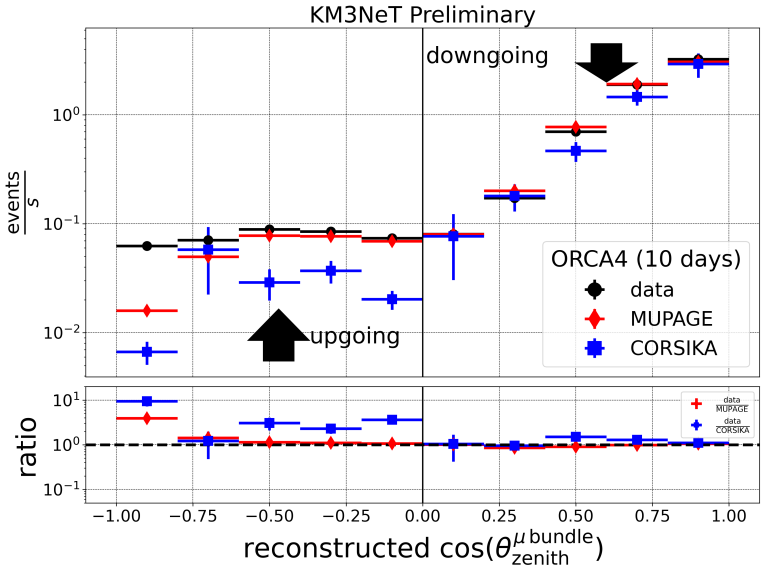


ARCA: Astroparticle Research with Cosmics in the Abyss
(main goal: ν_{astro})

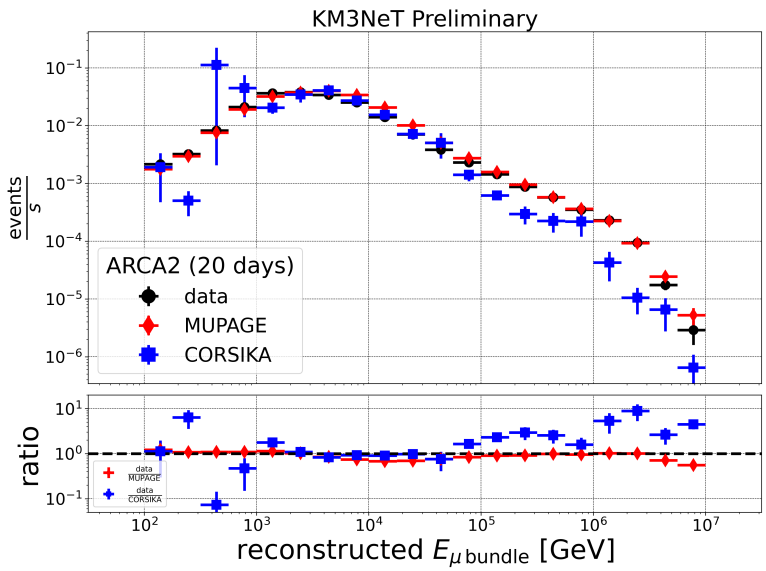
data vs MC

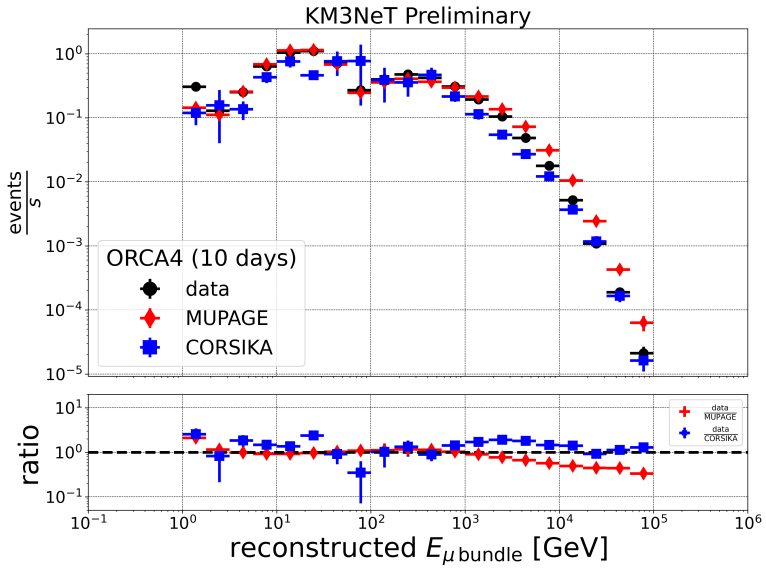
zenith





energy



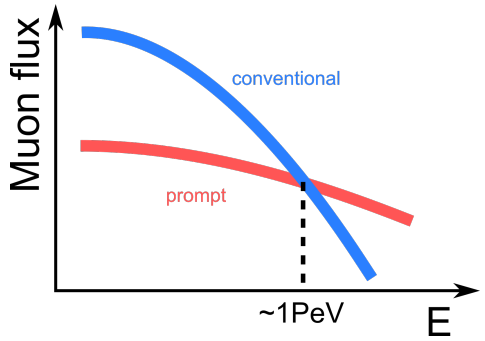


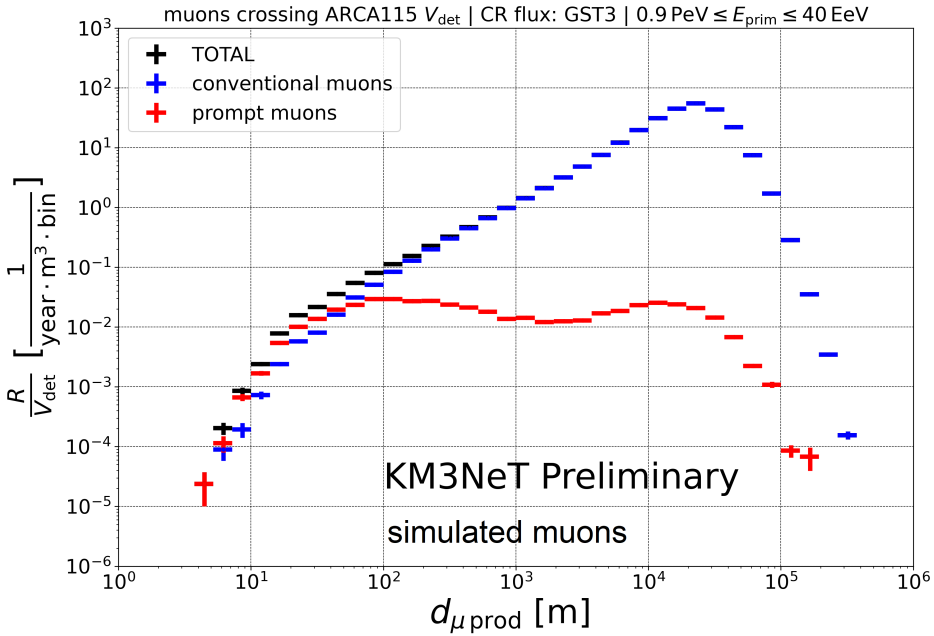
MC generators
CORSIKA v7.6400
MUPAGE v3r6
HE hadronic model
SIBYLL 2.3c
CR model
GST3
particles
μ bundles
stage
reco level
data livetime
ARCA2: 20 d
ORCA4: 10 d

Prompt muon analysis [MC-only]

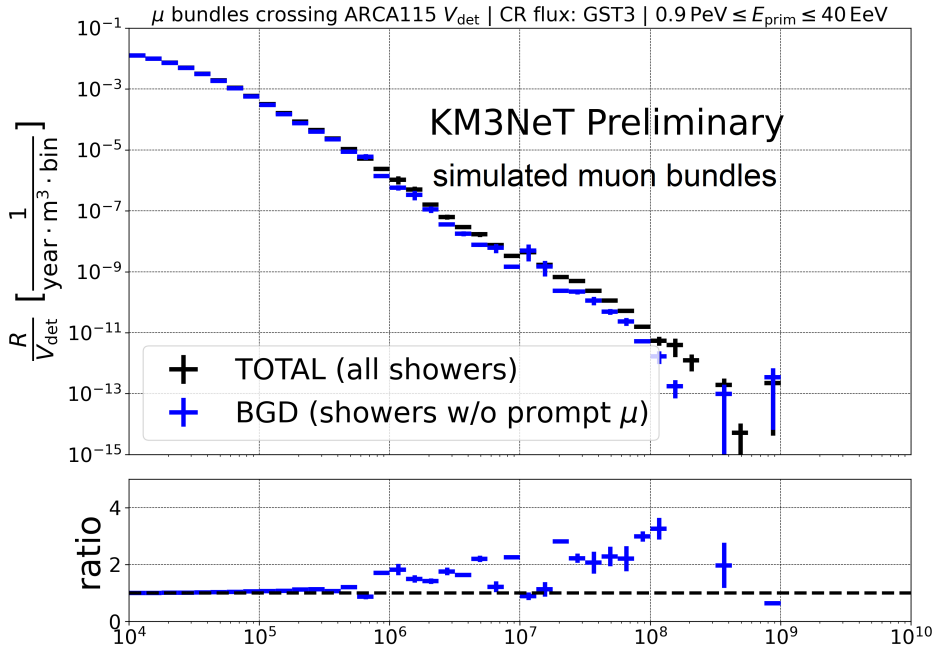
Categories commonly used for μ flux:

- **conventional**: mostly π and K decays
- **prompt**: mostly heavy hadron decays





(distance from primary to μ production vertex)



MC generators	HE hadronic model	CR model
CORSIKA v7.7400	SIBYLL 2.3d	GST3

particles	stage
μ bundles	detector level

Summary

data vs MC:

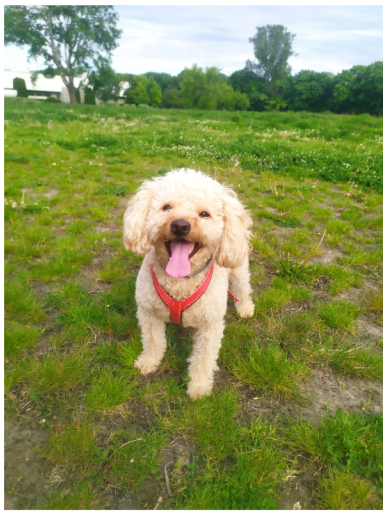
- data and MC are consistent
- next steps:
  - fix known issues
  - add systematic uncertainties
  - redo for ARCA6 and ORCA6

prompt muon analysis:

- first results encouraging
- next steps:
  - reconstruction level
  - sensitivities
  - compare with IceCube & theory

thank you!

Fiona



Mecenas

Enjoy ICRC!