KM3NeT/ORCA Performance for High Energy Neutrinos

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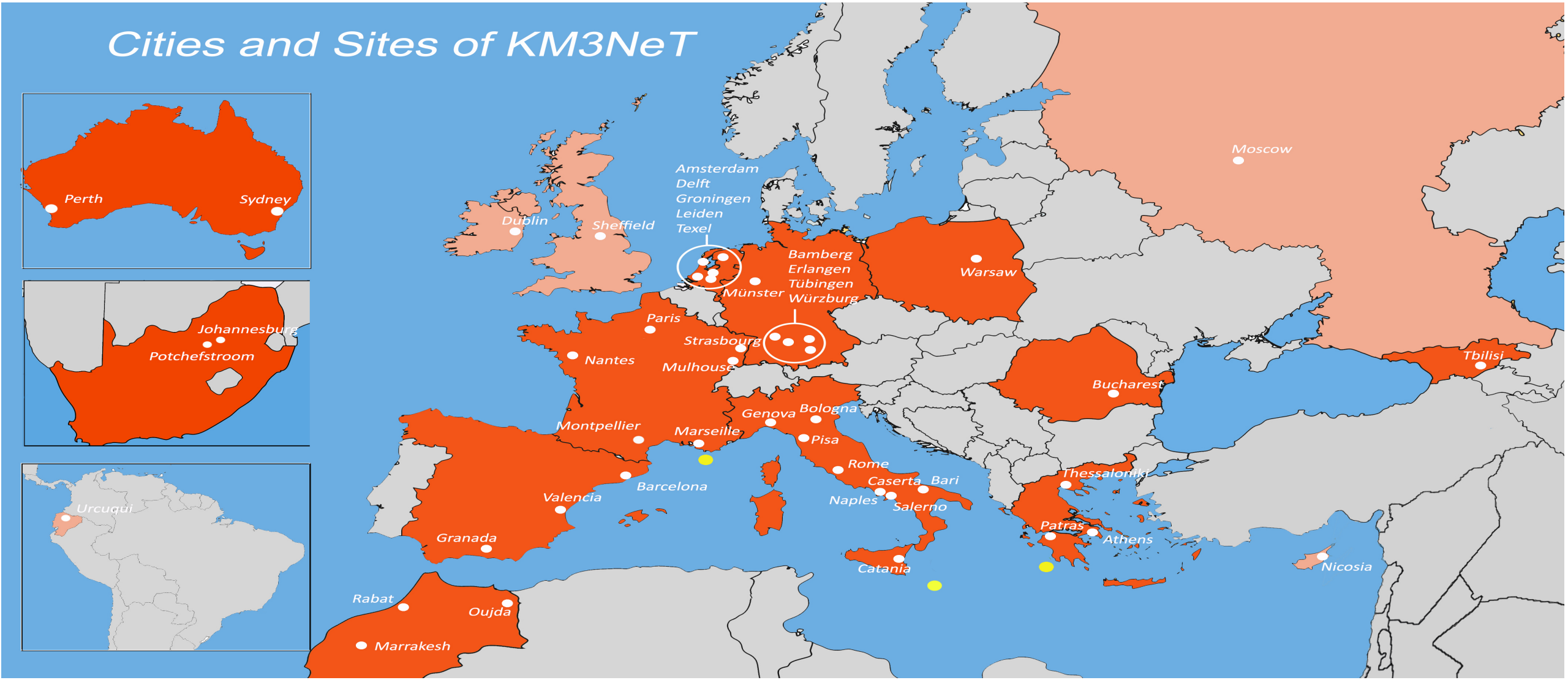
- KM3NeT Detectors
- Neutrino Physics and Astrophysics with KM3NeT
- ORCA Performance at High Energies
- Current Status and First Results
- Summary and Outlook

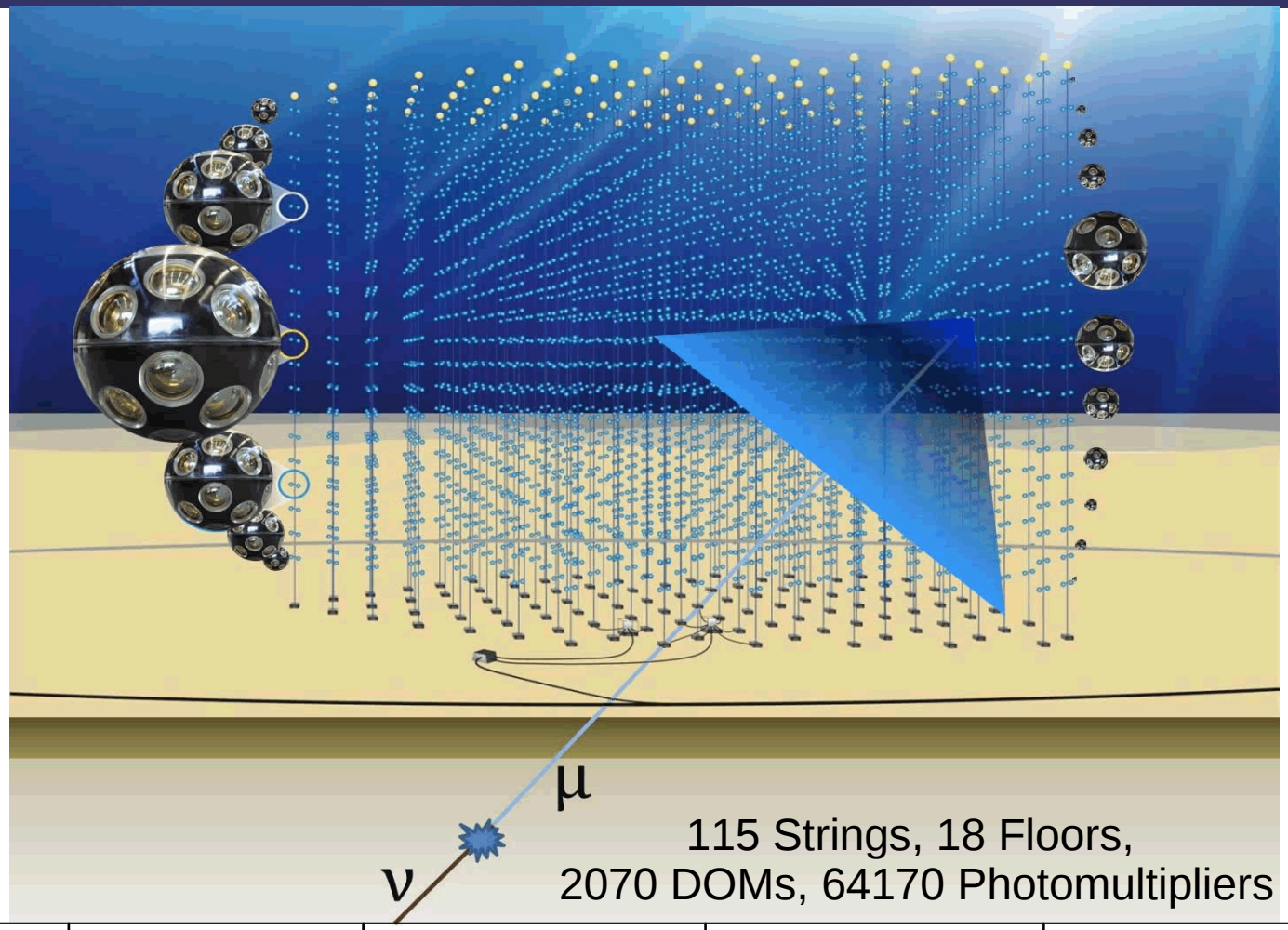
The KM3NeT Collaboration

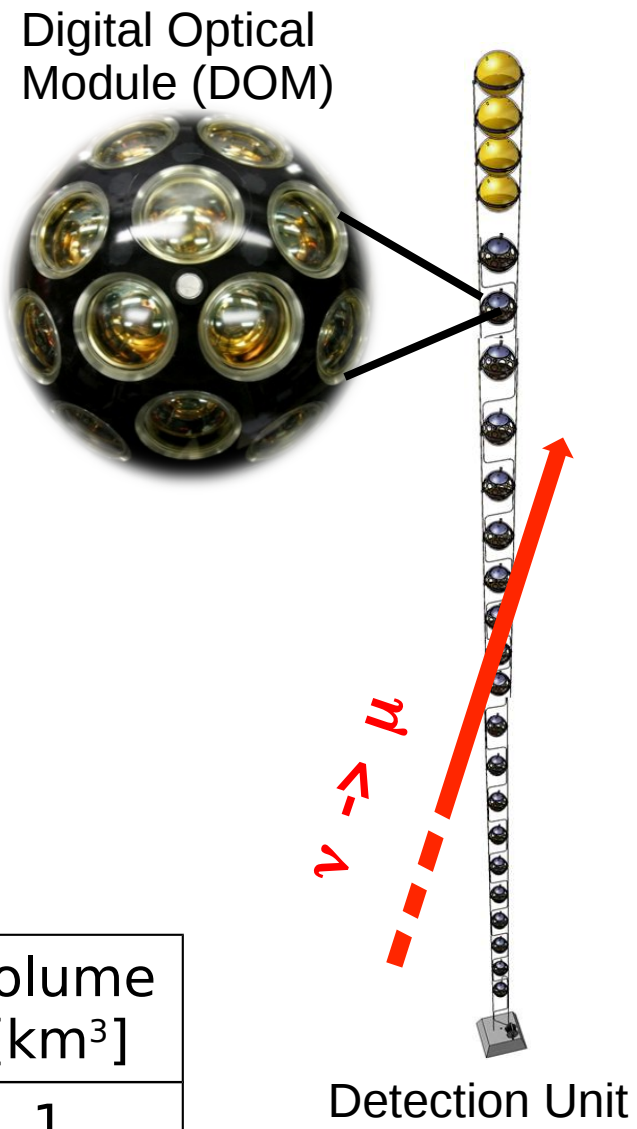


http://www.km3net.org/

More than 50 institutes from 17 countries.

The KM3NeT Detector

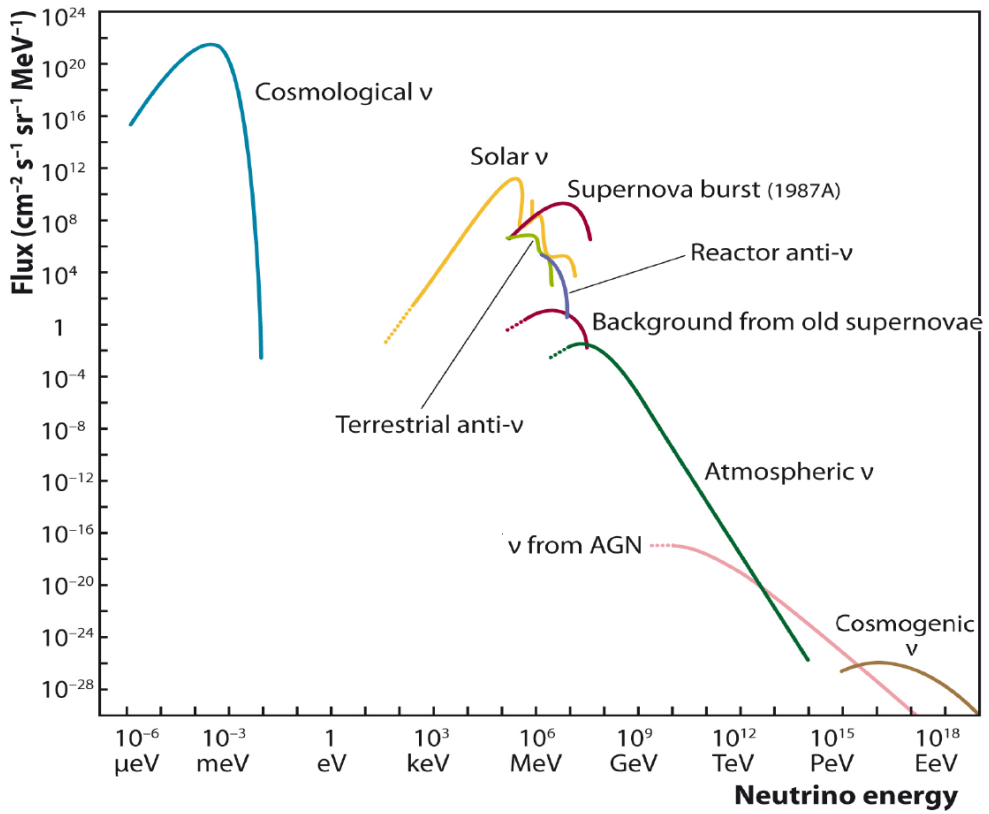




KM3NeT	Depth [m]	Horizontal spacing [m]	Vertical spacing [m]	Detection Unit	Volume [km³]
ARCA	3500	90	36	2 x 115	1
ORCA	2450	20	9	115	~0.005

Neutrino Physics and Astrophysics with KM3NeT

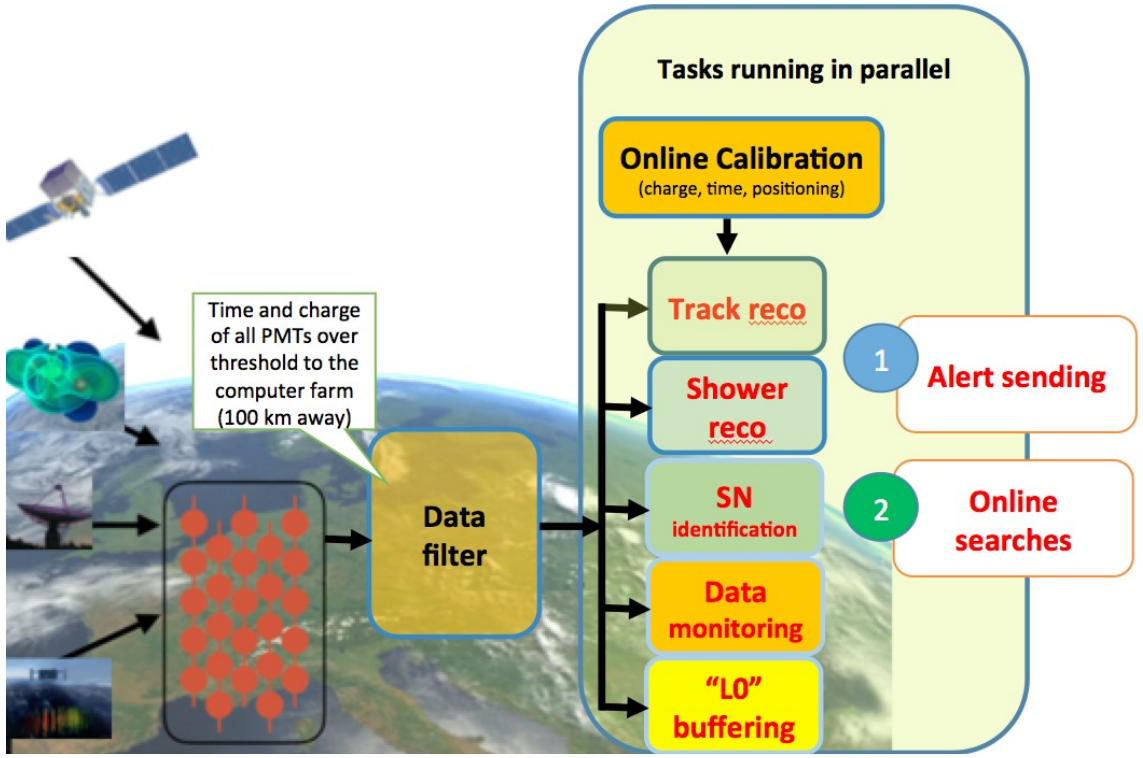
ORCA(Oscillation Research with Cosmics in the Abyss) and ARCA(Astroparticle Research with Cosmics in the Abyss) will detect neutrinos in the GeV-PeV range.



Studies with KM3NeT:

- Neutrino flux from CCSN
- Researching ν parameters
- Indirect Search for the DM
- Multimessenger observations
- Search for cosmic ν-sources

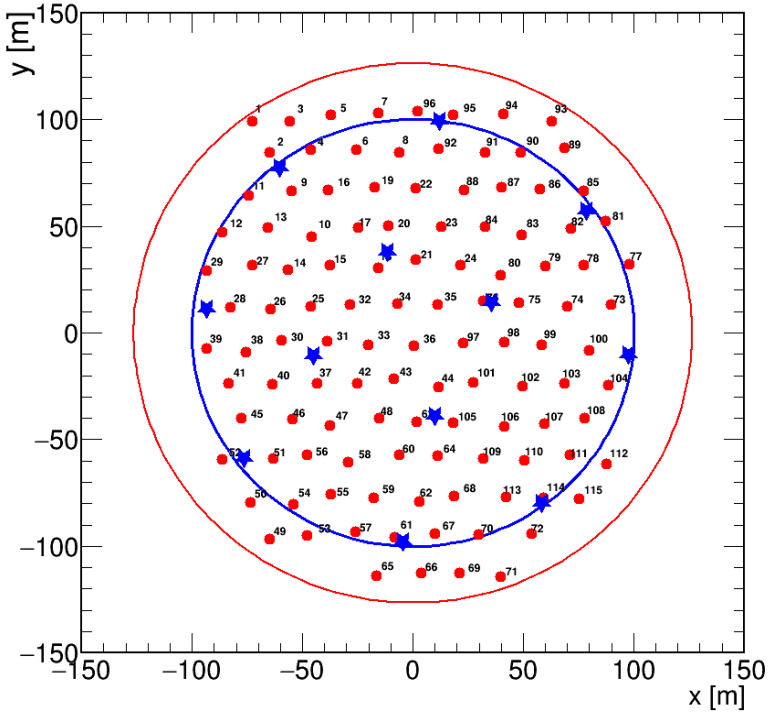
Multimessenger Astronomy



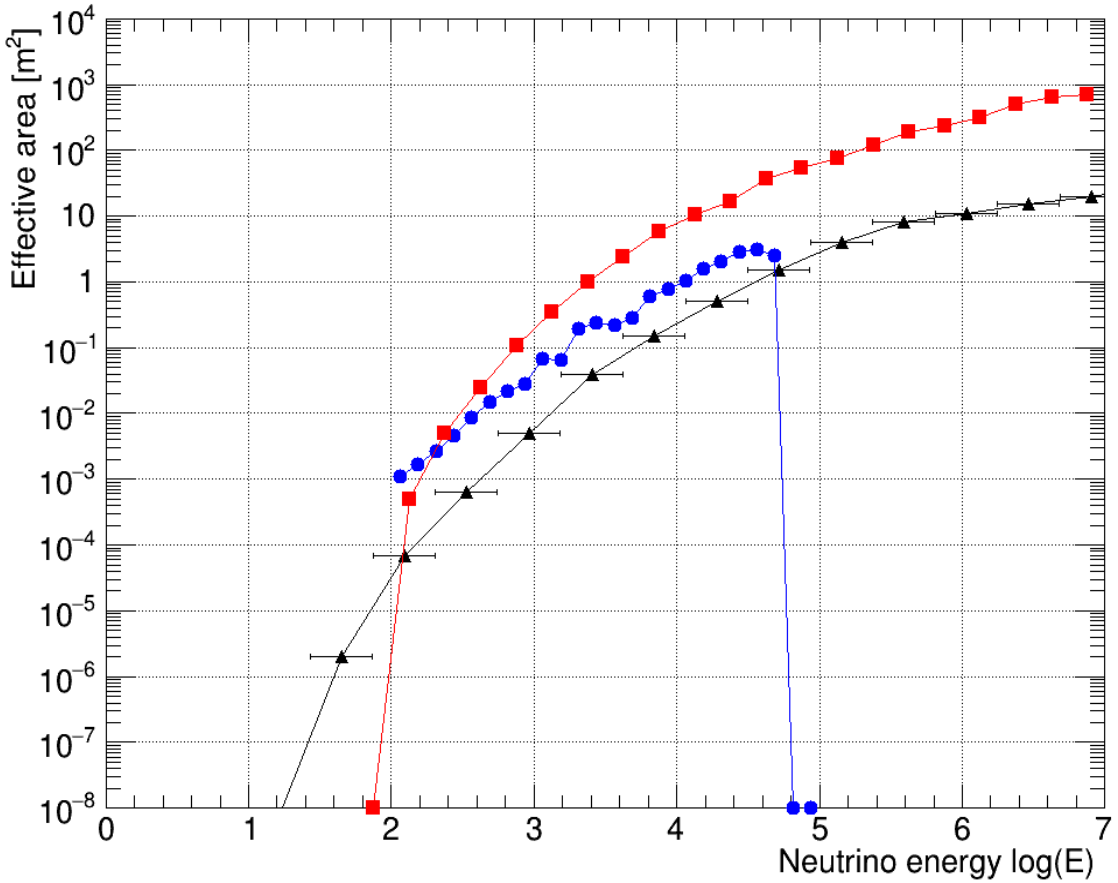
The simultaneous observation in space and time by neutrino telescopes, gravitational waves interferometers and multi-wave detectors (multi-messenger astronomy) is and will be in the next future the key approach for the understanding of the most remote and extreme phenomena in the cosmos.

ORCA Performance at High Energies

Could KM3NeT/ORCA contribute in multimessenger obsevations?



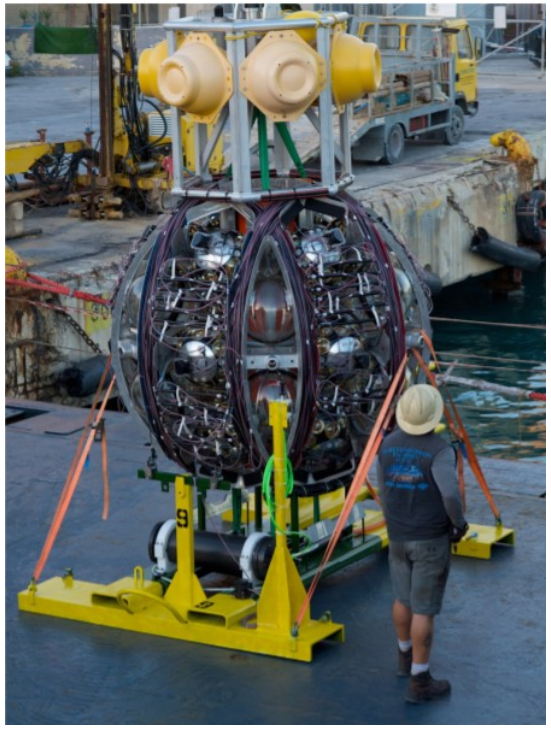
Footprints of KM3NeT/ORCA and ANTARES



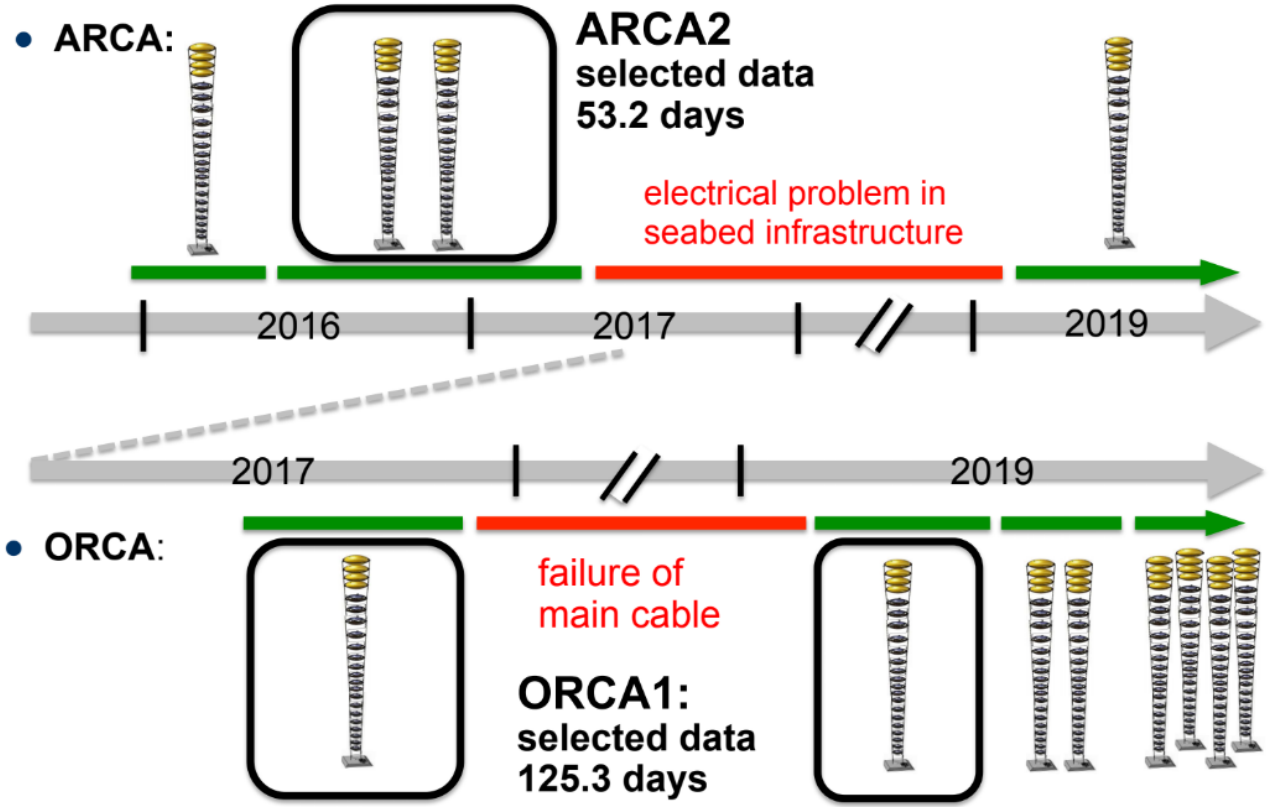
Effective areas of Mediterranean Neutrino telescopes (muon neutrio CC-events)

▲ ANTARES ● KM3NeT/ORCA ■ KM3NeT/ARCA

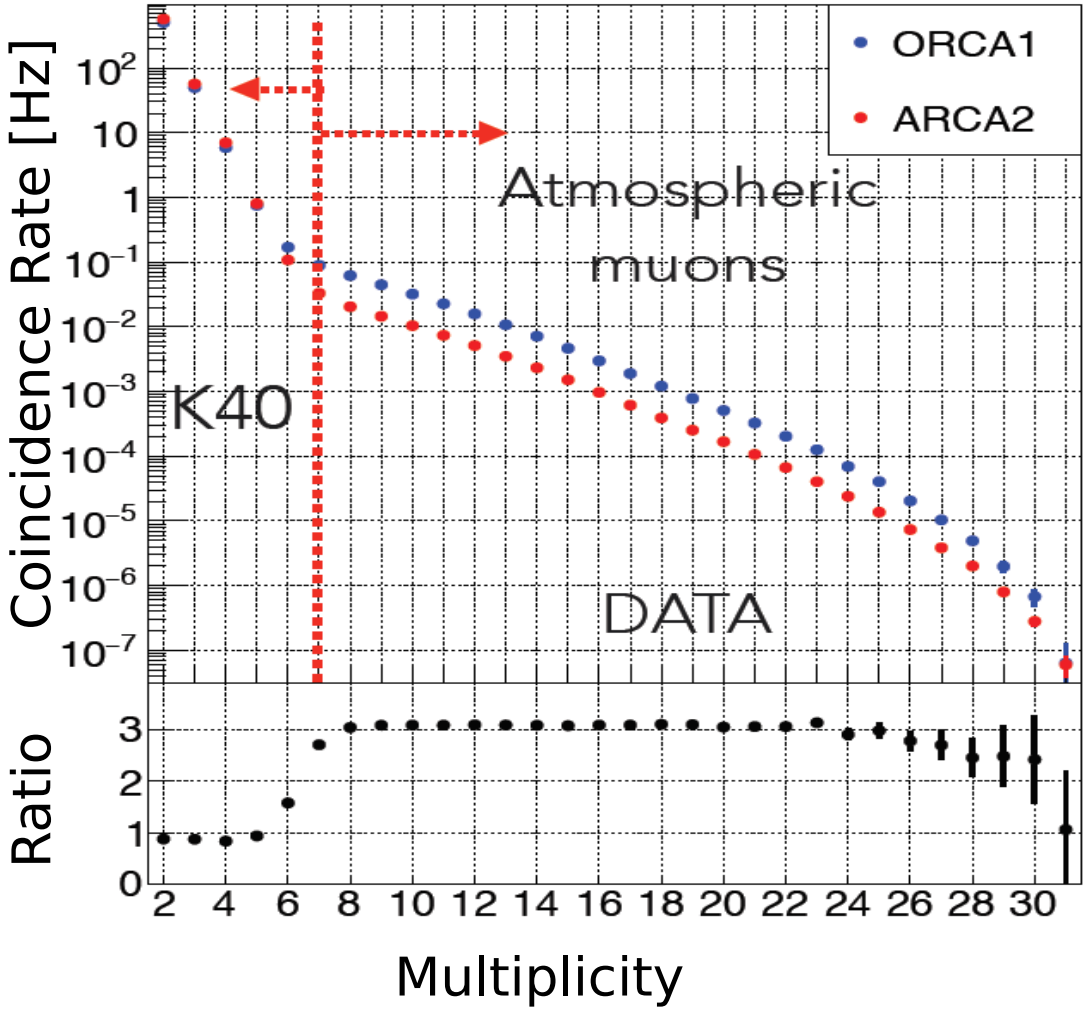
Current Status of the KM3NeT

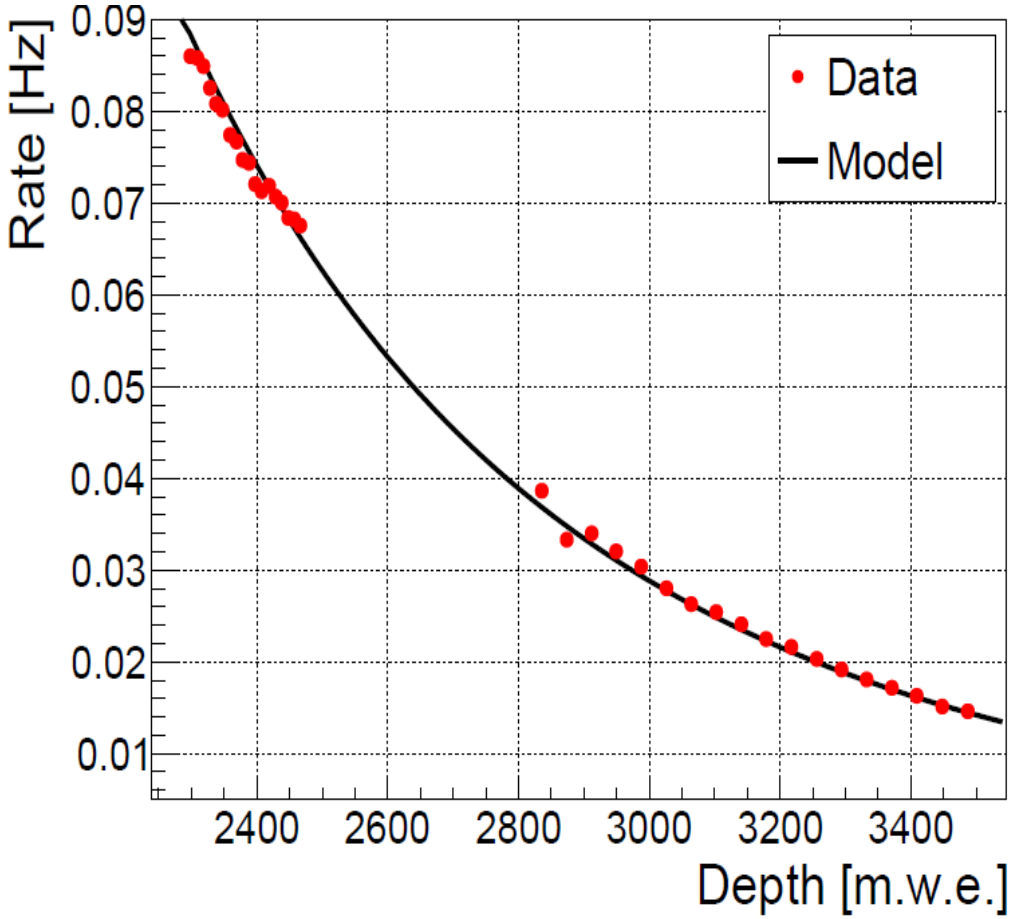


Launcher of Optical Modules



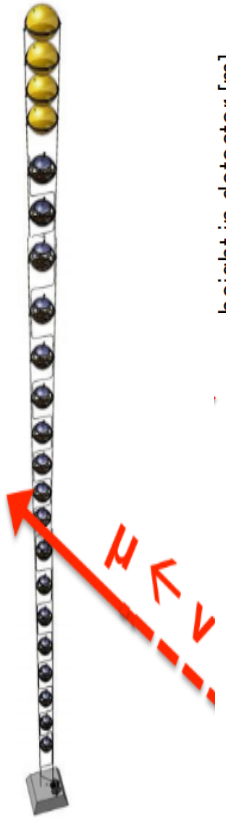
First Results of the KM3NeT

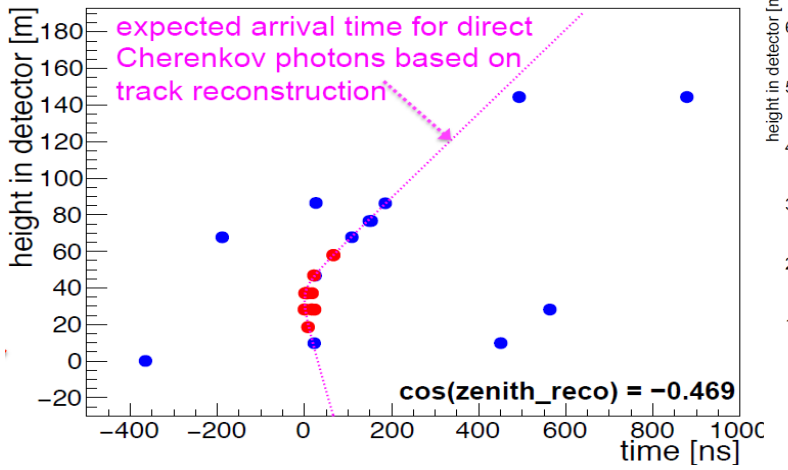




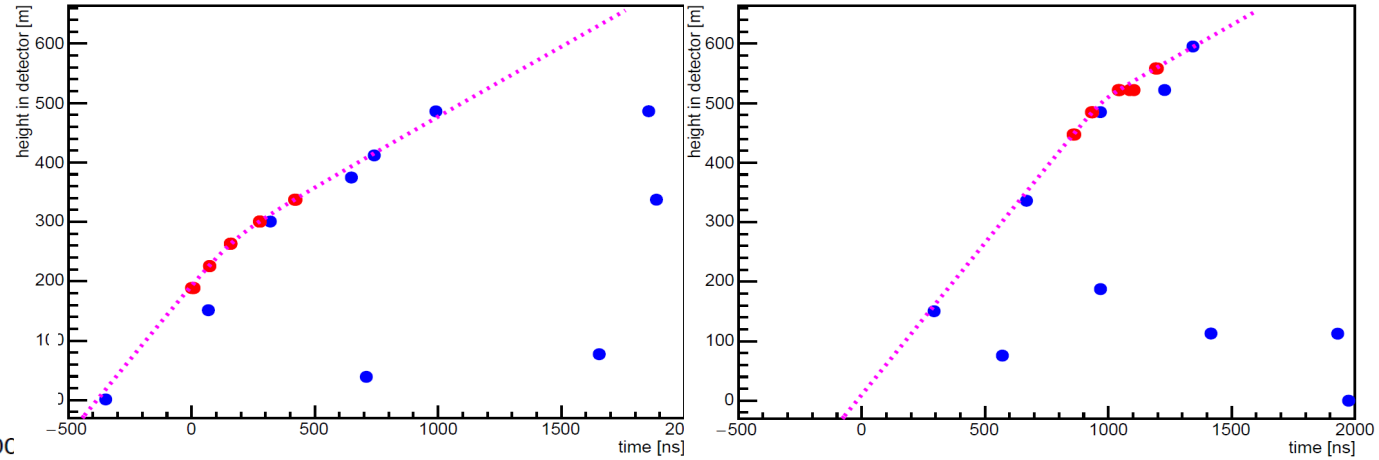
Multiplicity ≥8 coincidence rate of all DOMs as function of depth below the sea level.

First Results of the KM3NeT

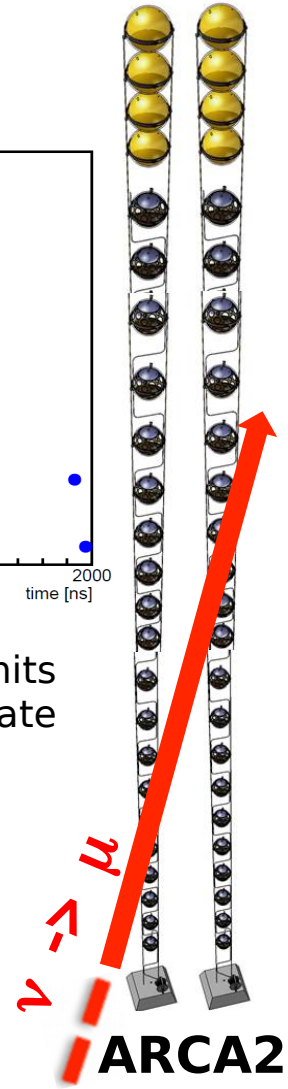




Height in the detector versus the time of the recorded PMT hits seen in ORCA1 for a neutrino candidate recon-structed as up-going.



Height in the detector versus the time of the recorded PMT hits seen in both DUs of ARCA2 for a neutrino candidate reconstructed as up-going.



ORCA1

ARCA2

Summary and Outlook

- KM3NeT is a large international project in the high energy neutrino astronomy and neutrino physics.

- KM3NeT-Tbilisi group is researching KM3NeT/ORCA performance at high energies

- We’ve got first results from ARCA and ORCA

- Currently for one detection unit of ARCA and four detection units of ORCA are taking the data

გმადლობთ ყურადღებისთვის!

Backup Slides

Neutrino Physics and Astrophysics with KM3NeT

ORCA(Oscillation Research with Cosmics in Abyss) and ARCA(Astronomy Research with Cosmics in Abyss KM3NeT will detect neutrinos in the GeV-PeV range.

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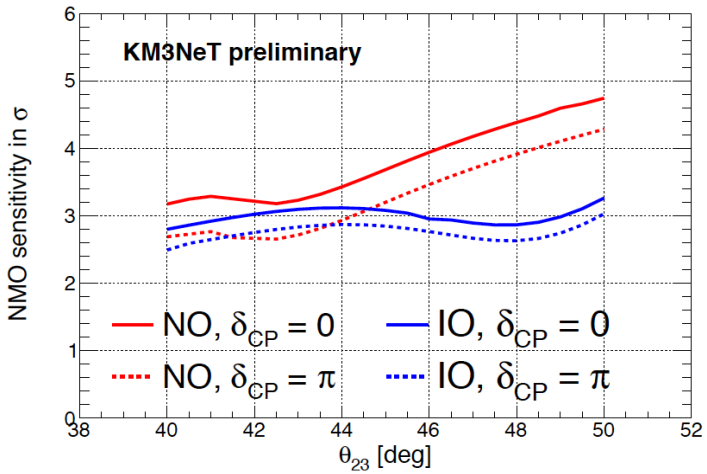
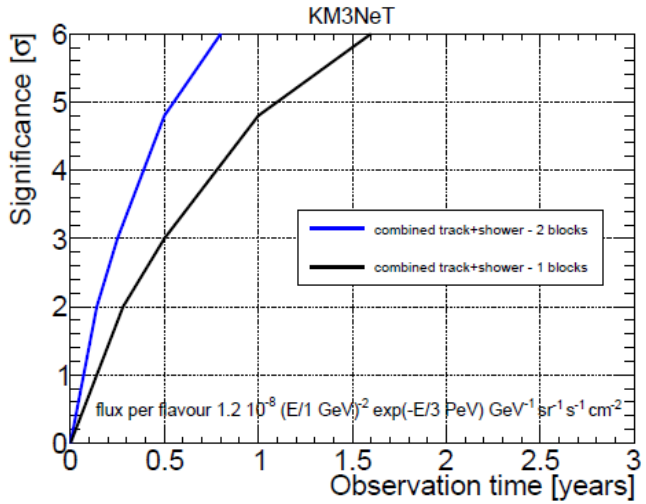


Sensitivity for NMH with 3 years of data



Significance for the diffuse ν-flux