

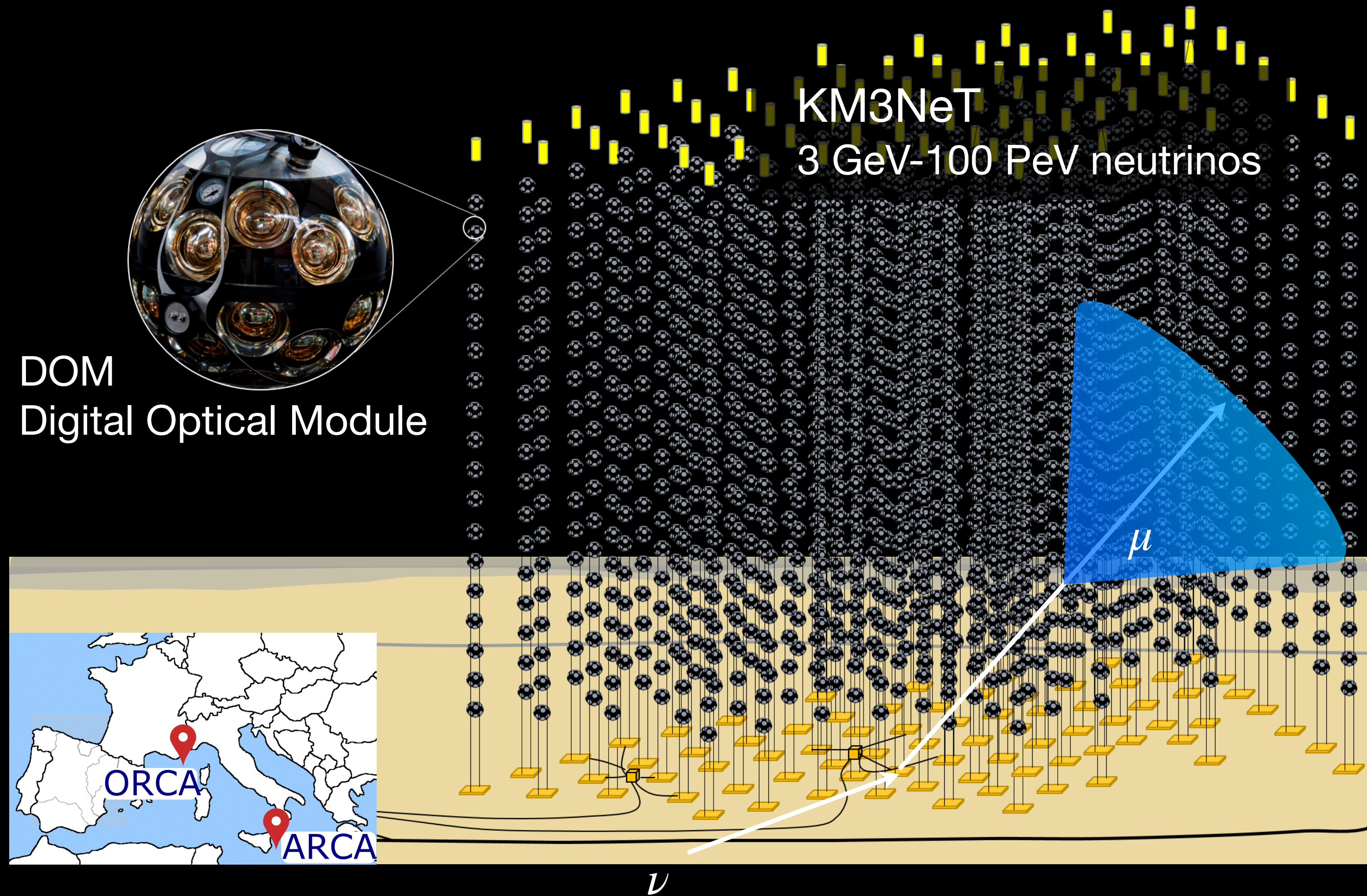
# The KM3NeT experiment

Water Cherenkov detector in the Mediterranean Sea



DOM  
Digital Optical Module

KM3NeT  
3 GeV-100 PeV neutrinos



# KM3NeT ARCA and ORCA

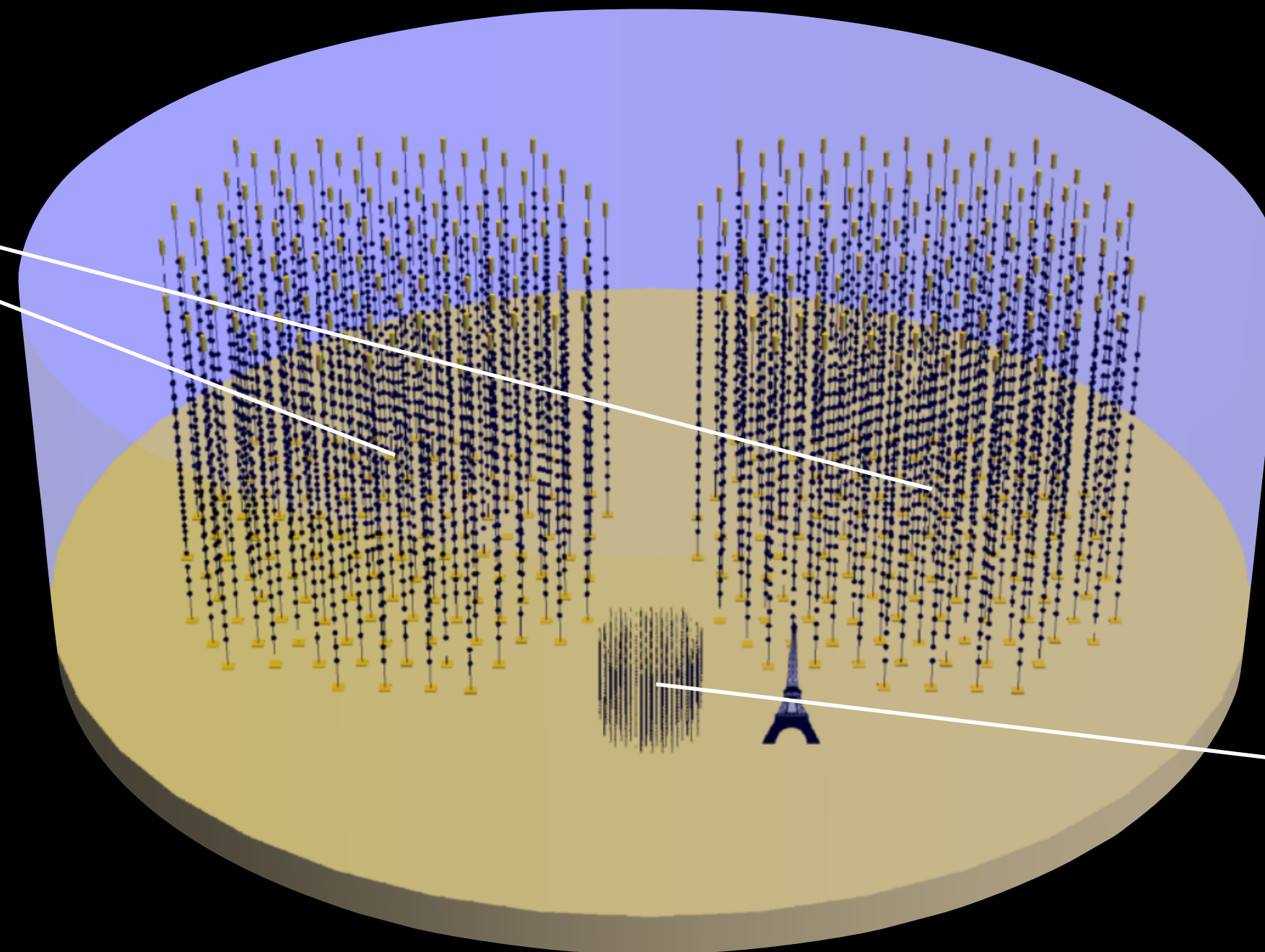


## ARCA

100 GeV — 100 PeV  
3500m deep — 1km<sup>3</sup>

90m between lines  
36m between OMs

Current: 51 lines  
Final: 230 lines



## ORCA

3 GeV — 100 GeV  
2500m deep — 7 Mton

28m between lines  
9m between OMs

Current: 28 lines  
Final: 115 lines

## France

- Centre de Physique des Particules de Marseille, Aix-Marseille Université, CNRS
- Institut Pluridisciplinaire Hubert Curien, Université de Strasbourg, CNRS
- Laboratoire Astroparticules et Cosmologie, CNRS, Université Paris Cité
- Laboratoire d'Astrophysique de Marseille, AMU, CNES, CNRS
- Laboratoire de Physique Corpusculaire de Caen, CNRS, Université de Caen
- Laboratoire Univers et Particules de Montpellier, CNRS, Université de Montpellier
- Institut Méditerranéen d'Océanologie, amU, CNRS, IRD, Marseille
- Université de Toulon, Chaire IA ADSIL, CIAN, CNRS
- Subatech, CNRS, IMT Atlantique, Nantes Université

## Spain

- Centro Oceanográfico de Murcia (IEO-CSIC)
- Instituto de Ciencias del Mar, CSIC, Barcelona
- Instituto de Física Corpuscular, Universitat de València, CSIC
- Laboratori d'Aplicacions Bioacústiques, Universitat Politècnica de Catalunya, Vilanova i la Geltrú
- Universitat Politècnica de València, IGIC, Gandia, València
- Universidad de Granada

## Algeria

- Center of Research in Astronomy, Astrophysics, and Geophysics, Bouzaréah
- Mohamed Boudiaf University, M'sila
- Université Badji Mokhtar, Annaba
- University of Constantine

## United Kingdom

- University of Hull

## Belgium

- UCLouvain, Louvain-La-Neuve
- Université Libre de Bruxelles

## United States of America

- Princeton University
- Drexel University, Philadelphia
- Harvard University, Cambridge

## Brazil

- São Paulo State University - UNESP

## Morocco

- Cadi Ayyad University, Marrakesh
- Mohammed VI Polytechnic University, Ben Guerir
- University Mohammed Ier, Oujda
- University Mohammed V, Rabat

## The Netherlands

- NIOZ, Texel
- NWO-I, Nikhef, Amsterdam
- TNO, Technical Sciences, Delft
- Universiteit van Amsterdam
- Universiteit Leiden

## Germany

- Friedrich-Alexander-Universität Erlangen-Nürnberg
- Max-Planck-Institut für Radioastronomie, Bonn
- Technische Universität München
- Universität Erlangen, Remeis Sternwarte, Bamberg
- Universität Münster
- Universität Würzburg

## Italy

- INFN Laboratori Nazionali del Sud
- INFN Sezione di Bari and Politecnico di Bari
- INFN Sezione di Bologna, Università di Bologna
- INFN Sezione di Catania, Università di Catania
- INFN Sezione di Firenze, Università di Firenze
- INFN Sezione di Genova, Università di Genova
- INFN Sezione di Napoli, Università di Napoli Federico II
- INFN Sezione di Padova, Università di Padova
- INFN Sezione di Roma, Sapienza Università di Roma
- Università della Campania L. Vanvitelli
- Università degli Studi di Salerno and INFN Gruppo Collegato di Salerno

## Norway

- Norwegian University of Science and Technology

## Czech Republic

- Czech Technical University in Prague, Institute of Experimental and Applied Physics

## Poland

- AGH University of Krakow
- NCBJ - National Centre for Nuclear Research, Warsaw
- Nicolaus Copernicus Astronomical Center, Particle Astrophysics Science and Technology Centre, Warsaw

## Romania

- Institute of Space Science - INFLPR Subsidiary, Magurele

## Slovakia

- Univerzita Komenského v Bratislave
- Slovenská akadémia vied, Kosice

## Greece

- Institute of Nuclear and Particle Physics, NCSR Demokritos, Athens
- National and Kapodistrian University of Athens

## China

- Sun Yat-Sen University, Zhuhai

## Georgia

- Tbilisi State University
- University of Georgia, Tbilisi

## South Africa

- North-West University, Potchefstroom
- University of Johannesburg
- University of the Witwatersrand, Johannesburg

## United Arab Emirates

- Khalifa University of Science and Technology, Abu Dhabi
- University of Sharjah

## Australia

- Western Sydney University

**KM3NeT Collaboration**  
5 continents, 22 countries, 69 institutes

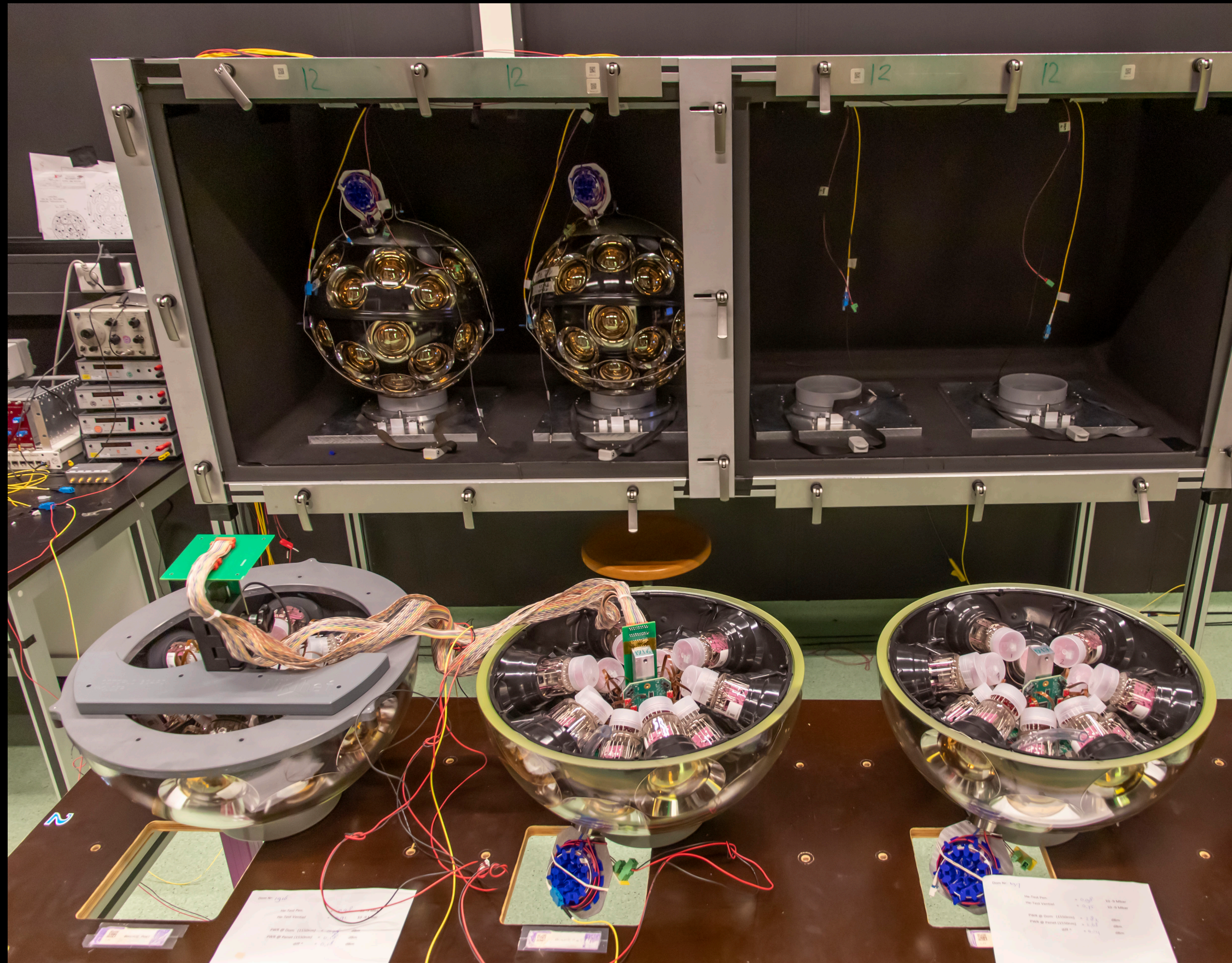


■ Full members

■ Observer members

# Fabrication des détecteurs

## Assemblage des modules optiques





AG 887 LH

HAZARDOUS

FUGRO

FUGRO

FUGRO

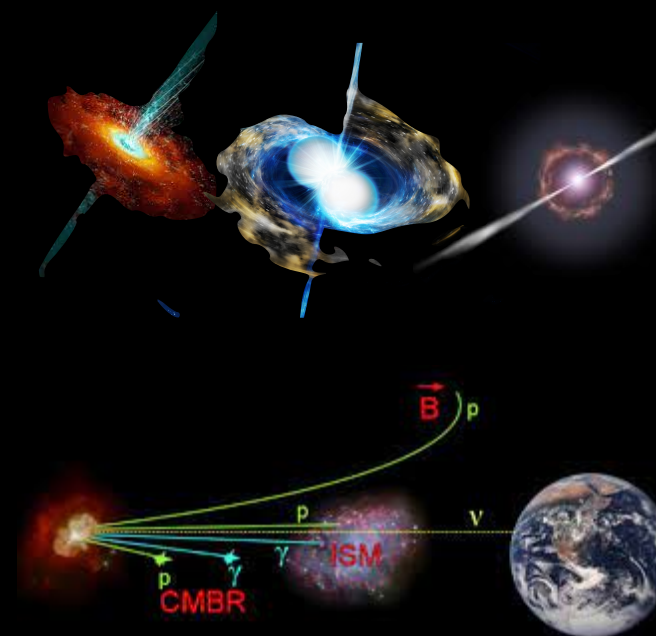
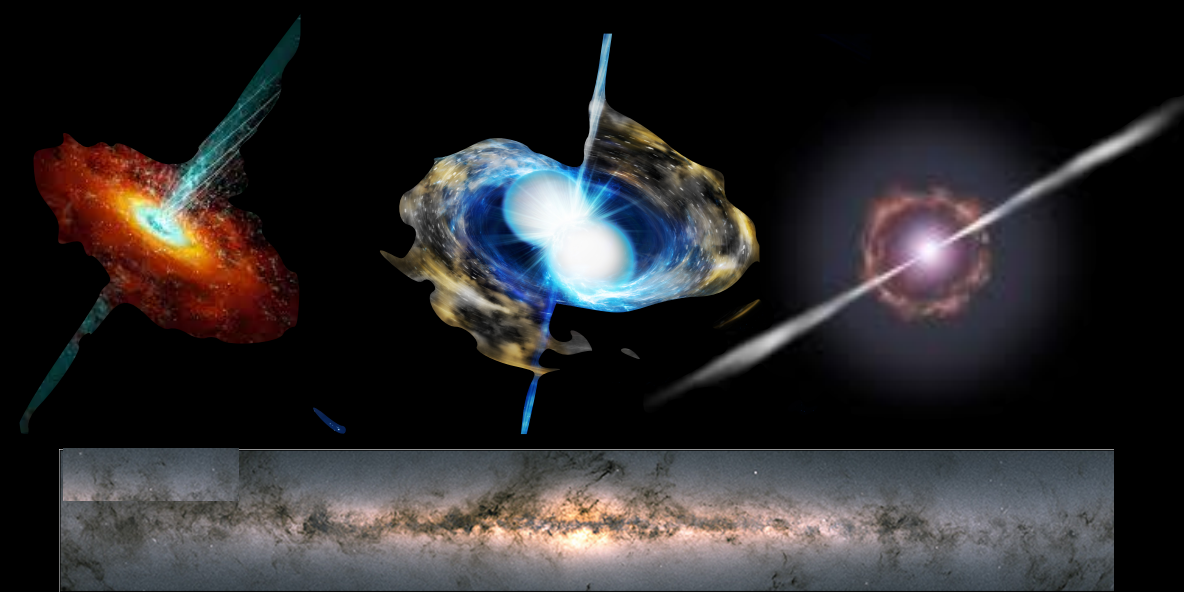
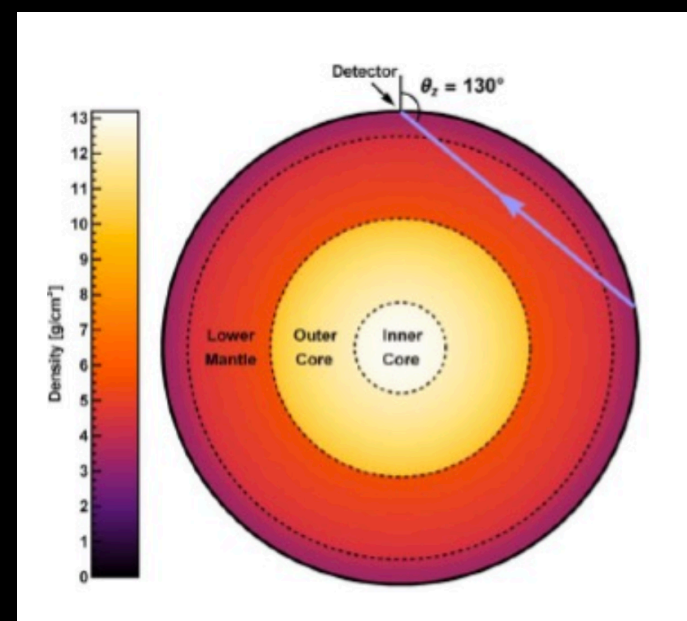
egreko

egreko

# KM3NeT search program



Core-collapse  
Supernovae



UHE signals  
from sources?

Cosmogenic  
neutrinos?

GeV

TeV

PeV

Neutrino oscillations  
Determine mass ordering

Astrophysical sources

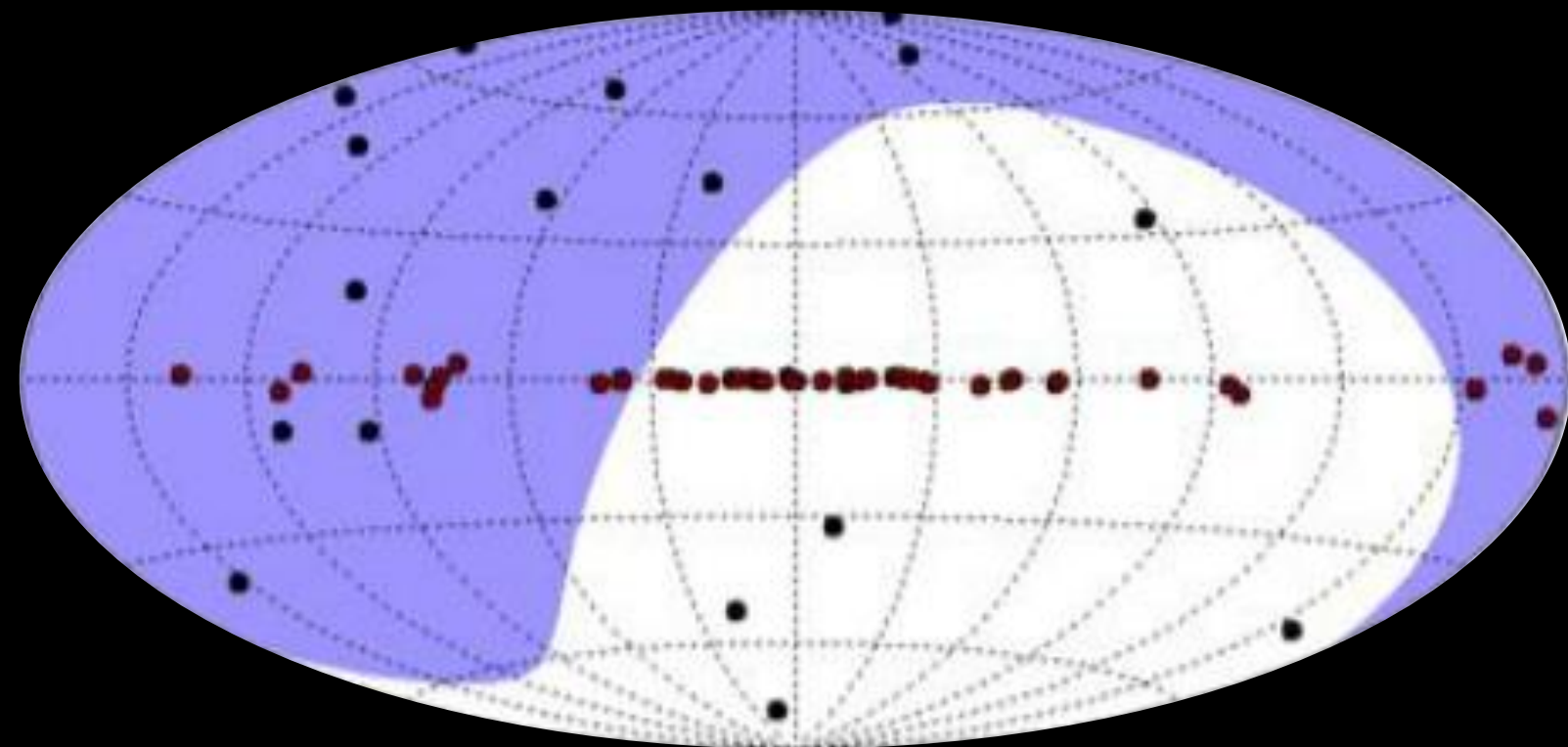
Single DOM

← ORCA →

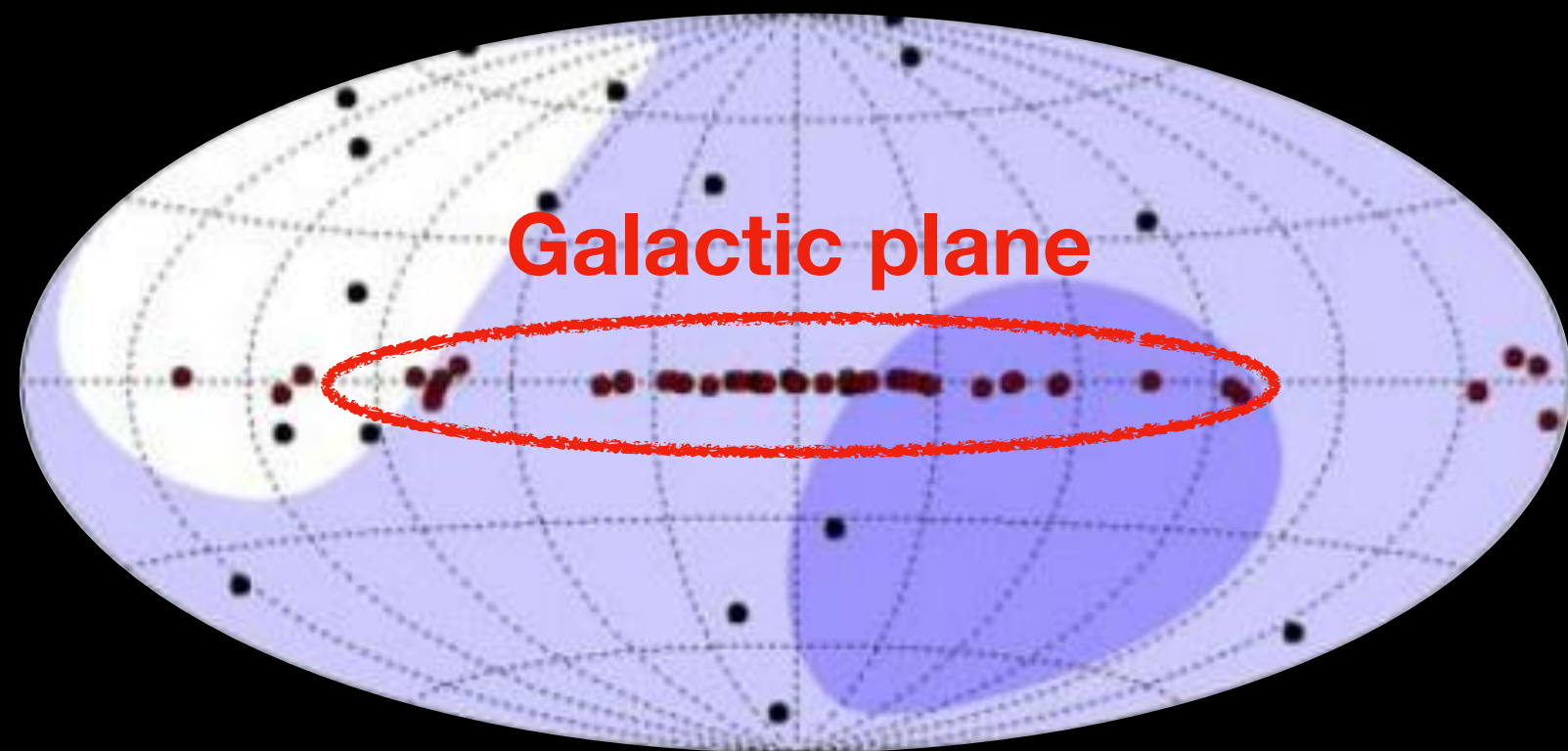
ARCA →



# KM3NeT — IceCube complementarity

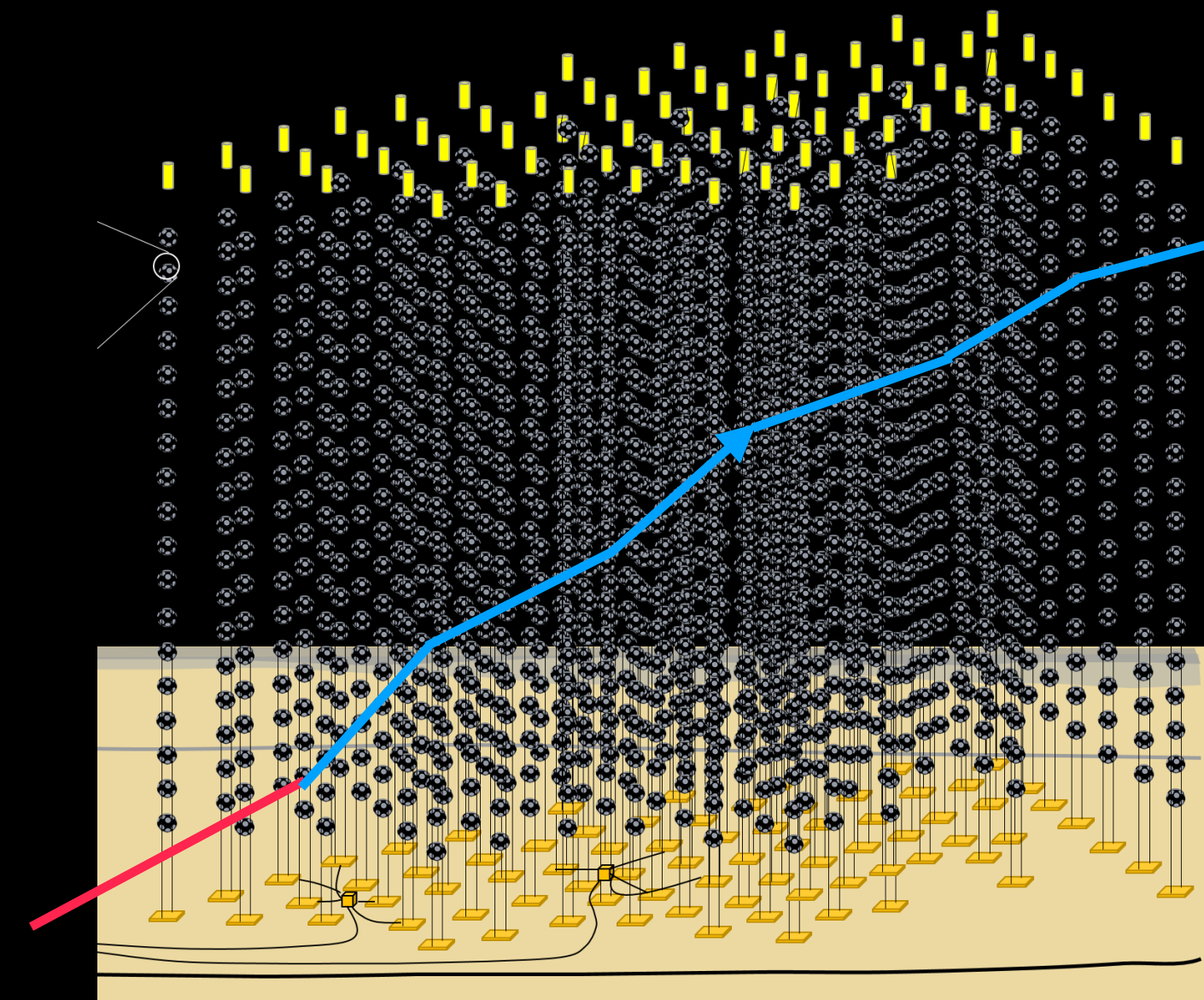


IceCube



Galactic plane

KM3NeT



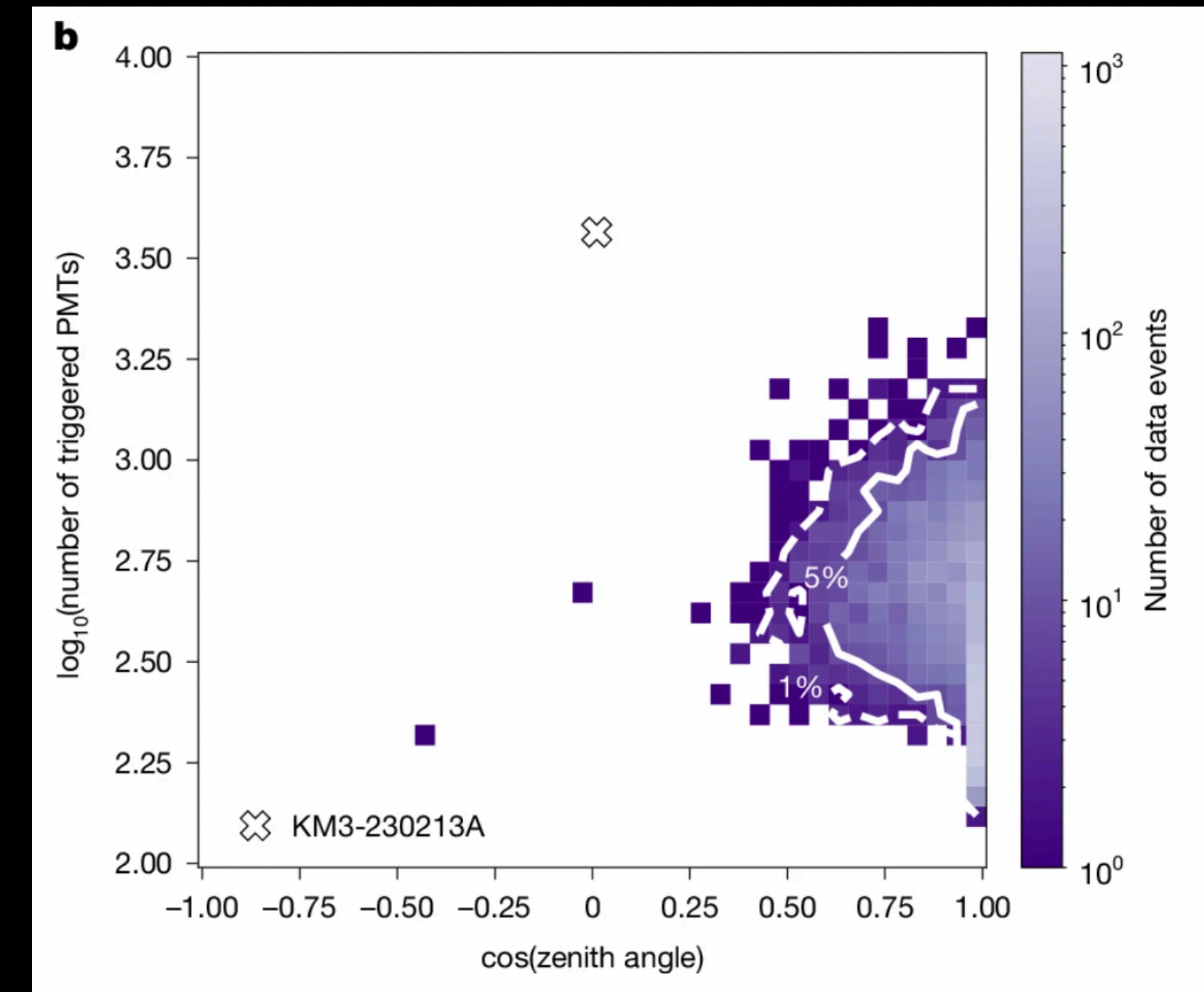
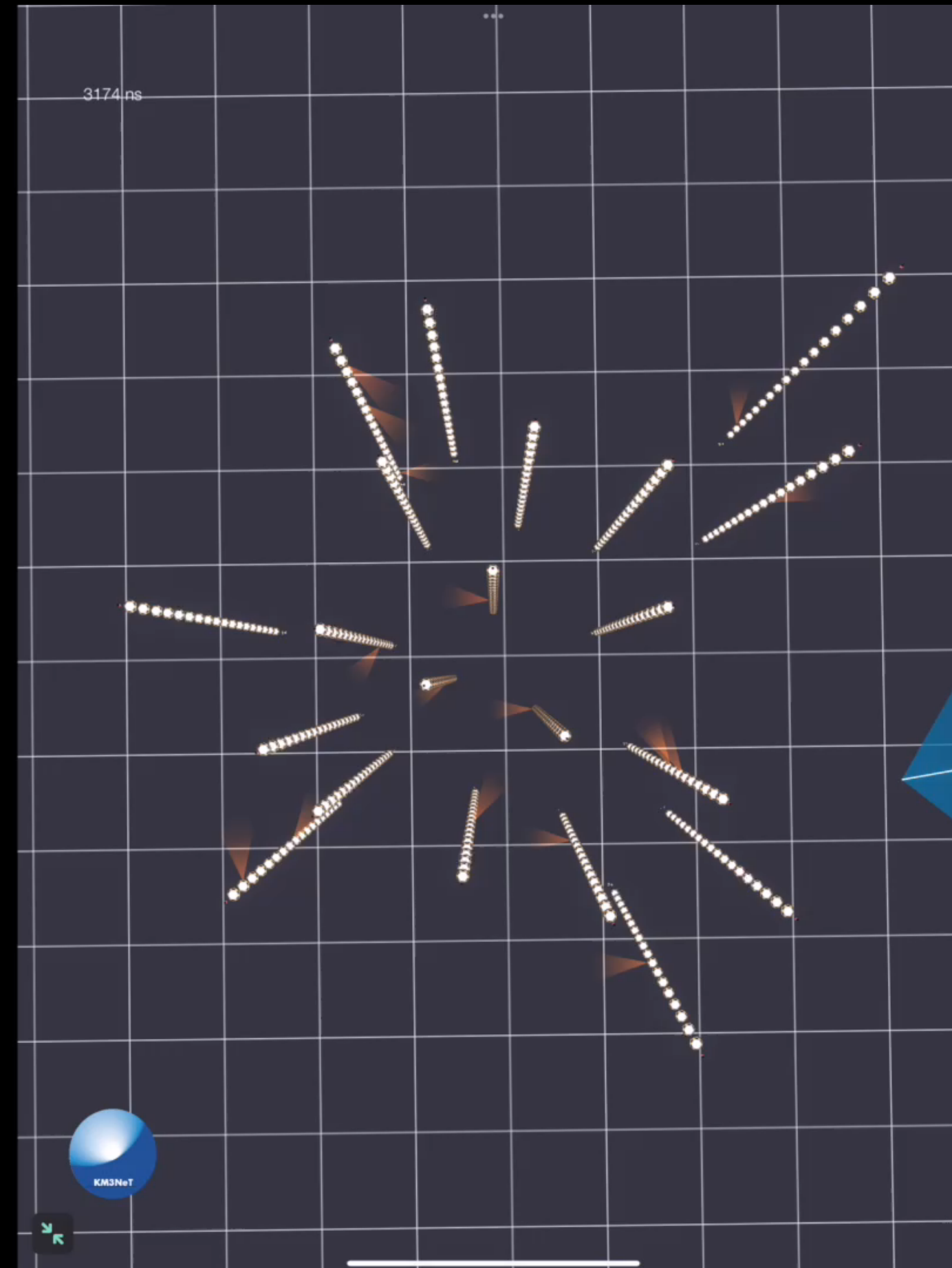
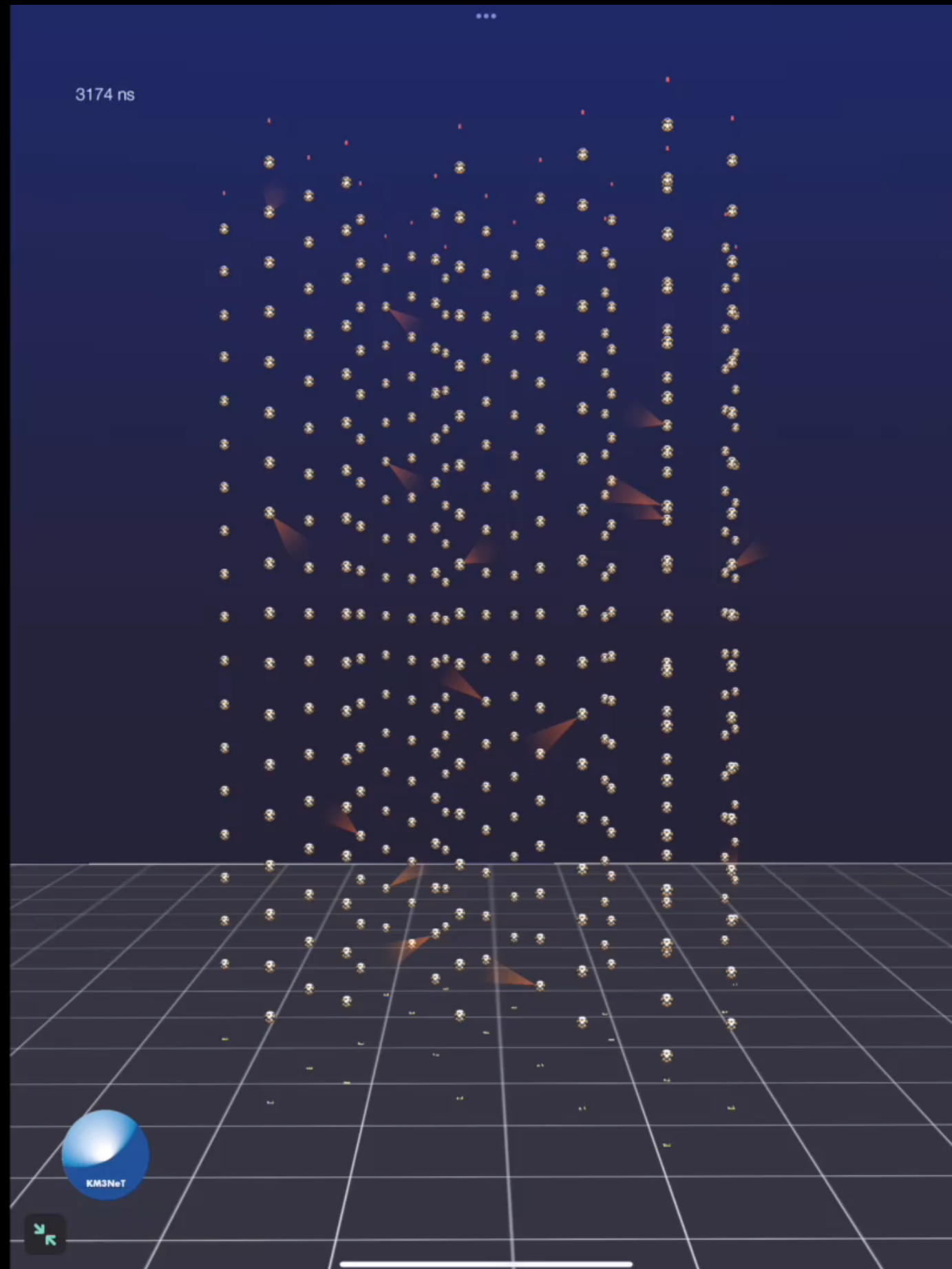
**Complementary sky coverage**

**Seawater → more absorption, less scattering**

**IceCube has a better energy resolution**

**KM3NeT has a better directional resolution**

# A very-high-energy event — February 2023

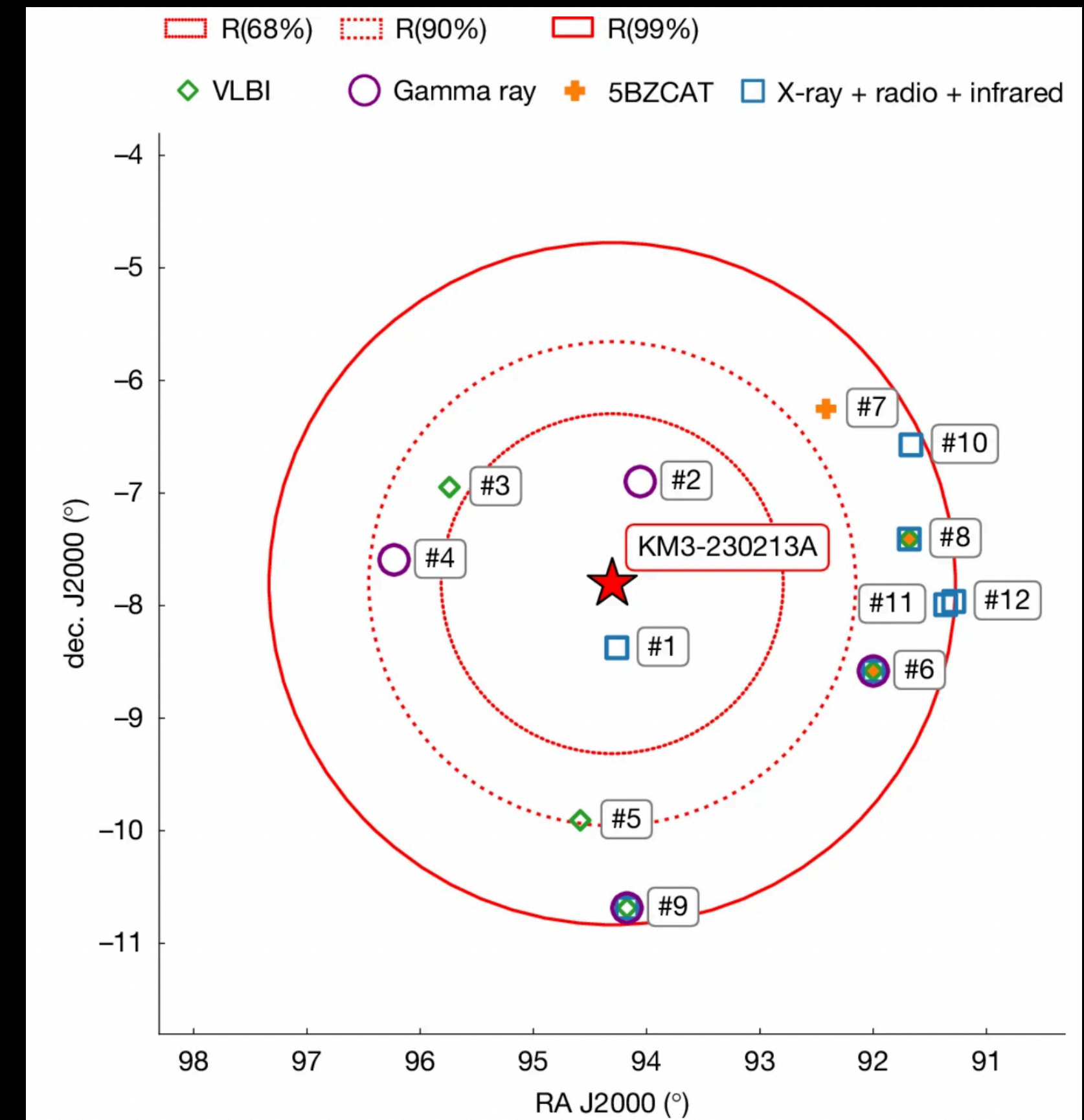
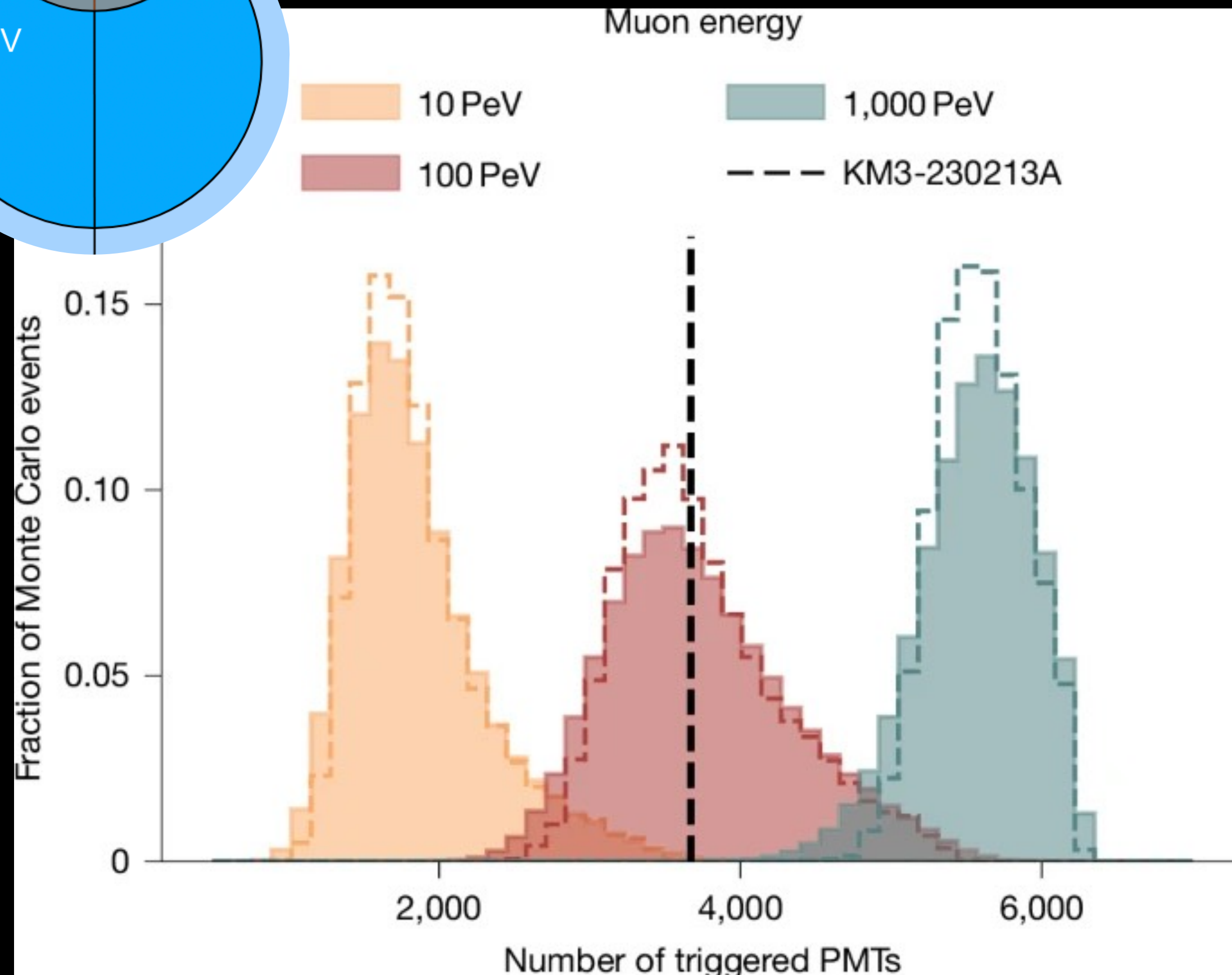
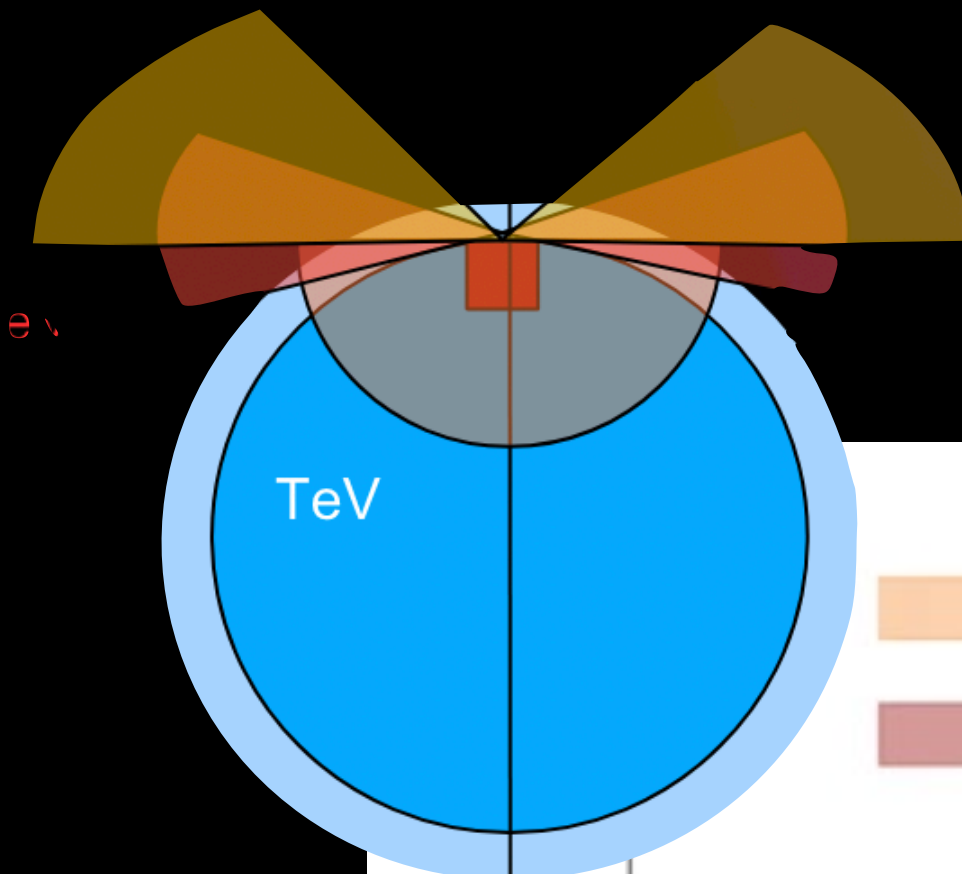


# The most energetic neutrino observed to date

Muon:  $120_{-60}^{+110}$  PeV

Neutrino:  $220_{-100}^{+570}$  PeV

**RA=94.3° dec=-7.8°**  
with 1.5° error circle



# The astrophysical neutrino landscape

From TeV scale to 100s of PeVs

