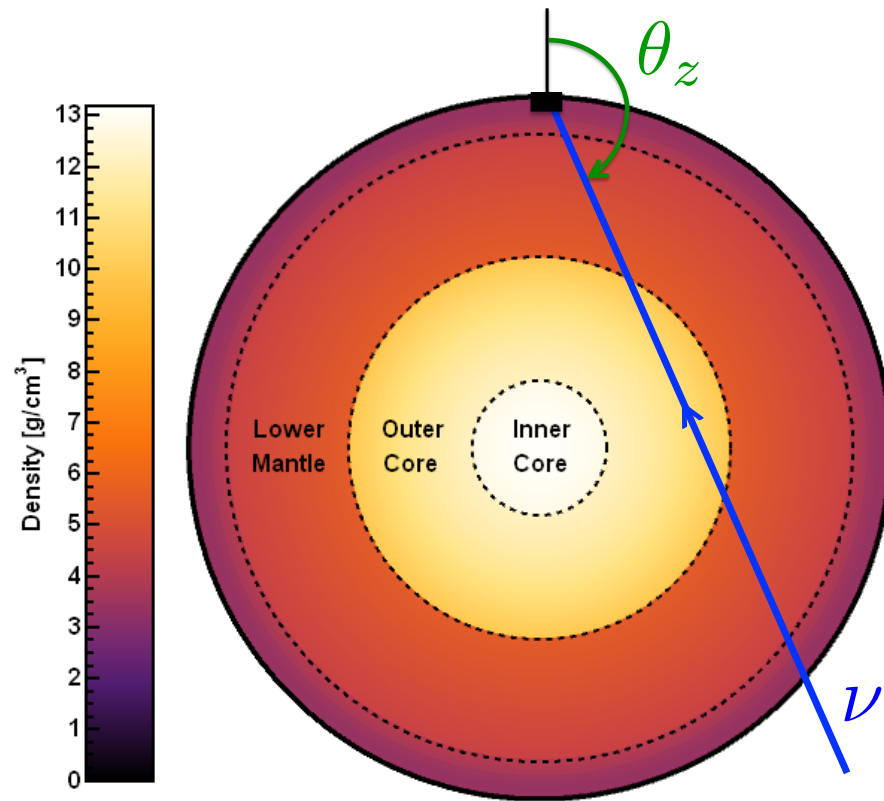# KM3NeT performance on oscillation and absorption tomography of the Earth

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on behalf of the KM3NeT Collaboration
37th ICRC, 12-23 July 2021
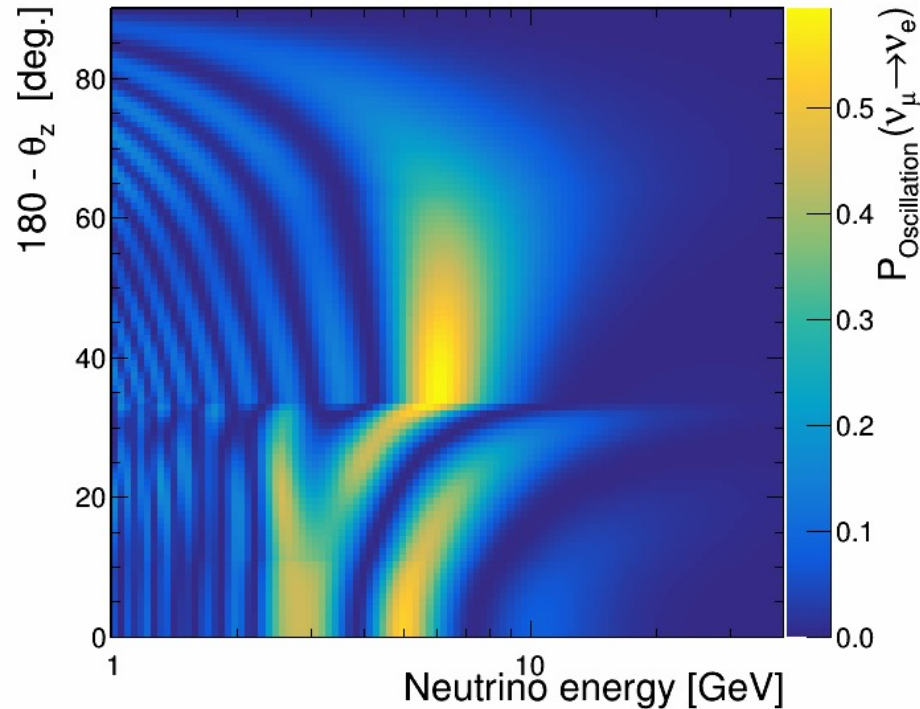Berlin, Germany

Motivation

Seismic measurements revealed a 3-layer Earth model [PREM]:

- Inner core:
  $\sim 12 \frac{g}{cm^3}$, Iron + Nickel
- Outer core:
  $\sim 11 \frac{g}{cm^3}$, Iron + Nickel + lighter elements
- Mantle:
  $\sim 6 \frac{g}{cm^3}$, pyrolite

Can we probe the Earth's interior with atmospheric neutrinos?
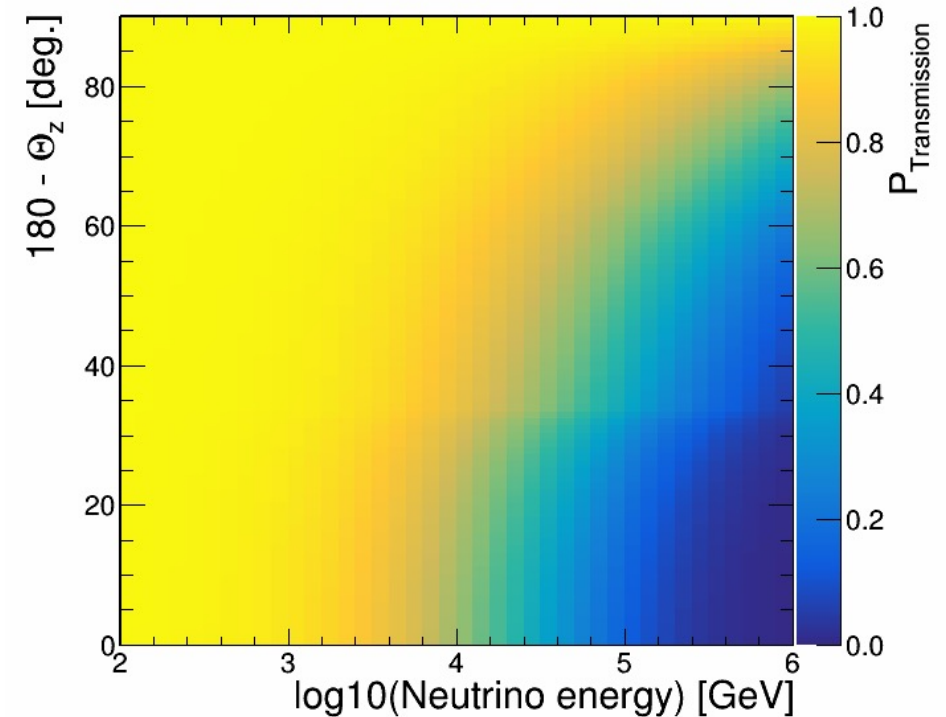
Methods

Extra potential induced by **electrons** affects **oscillation probabilities**

$$V_{CC} = \pm\sqrt{2}\, G_F N_e$$

High energetic neutrinos get **absorbed**

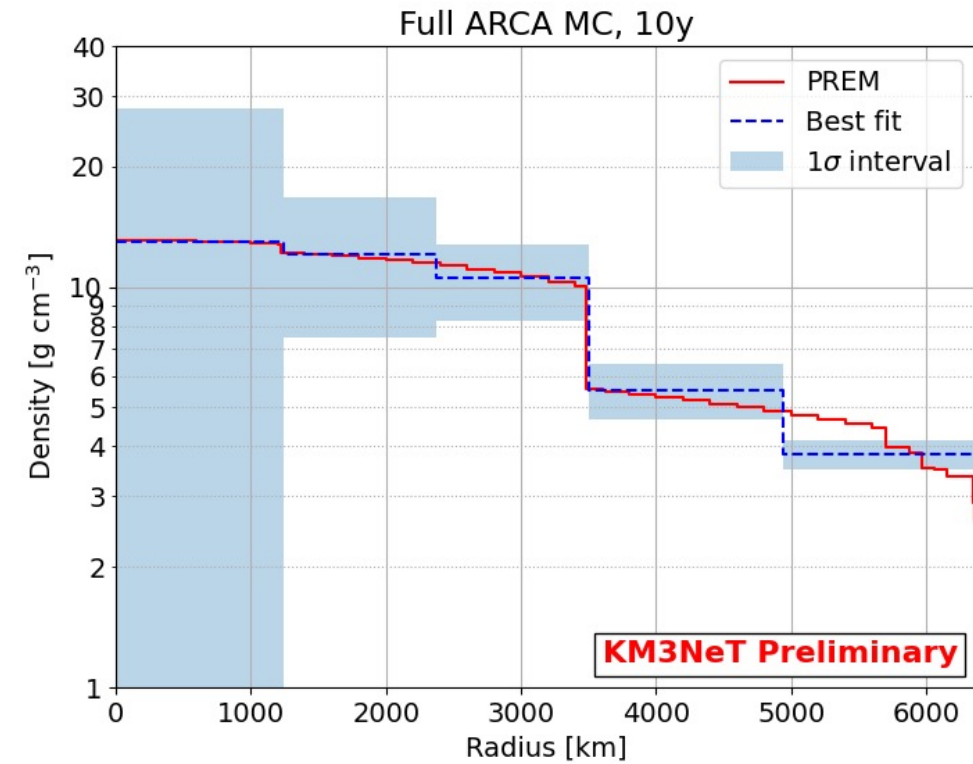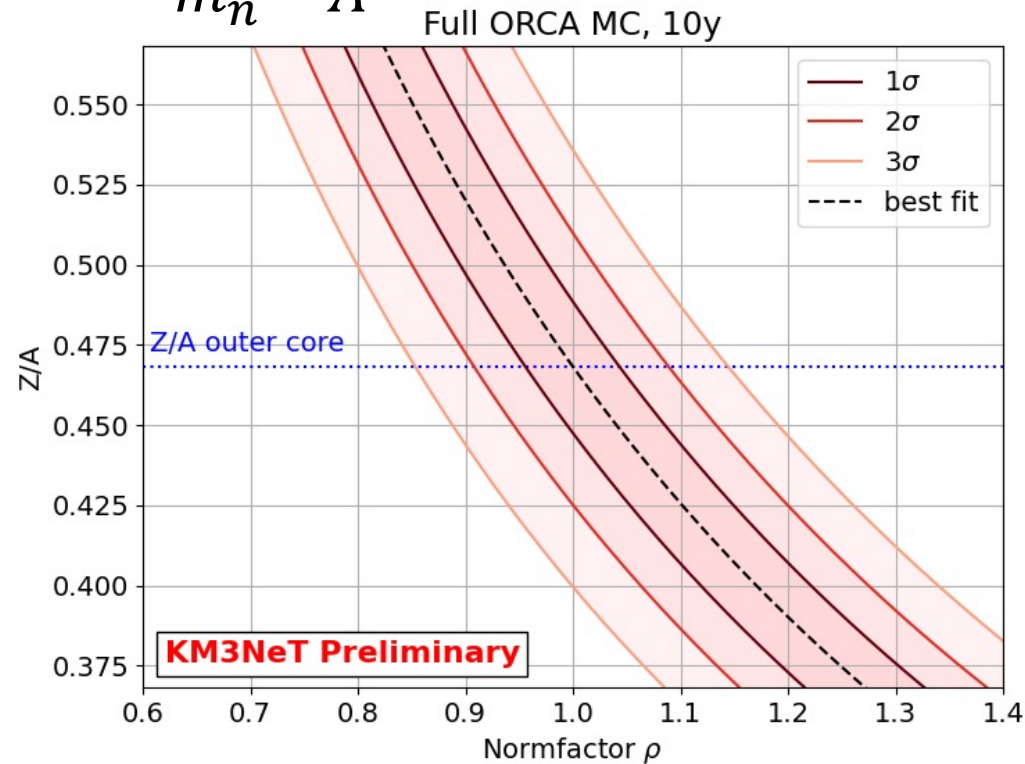$$P_{Absorption} = \exp\left(-l\, \frac{\rho}{m_n}\, \sigma\right)$$

=> Fit Earth model to determine N_e and ρ

Results

$$N_e = \frac{N_A}{m_n} \times \frac{Z}{A} \times \rho$$

KM3NeT will be the first experiment to able to probe the Earth's interior with **oscillation and absorption tomography**.