

# NeuTel XIX Conference (as we speak)



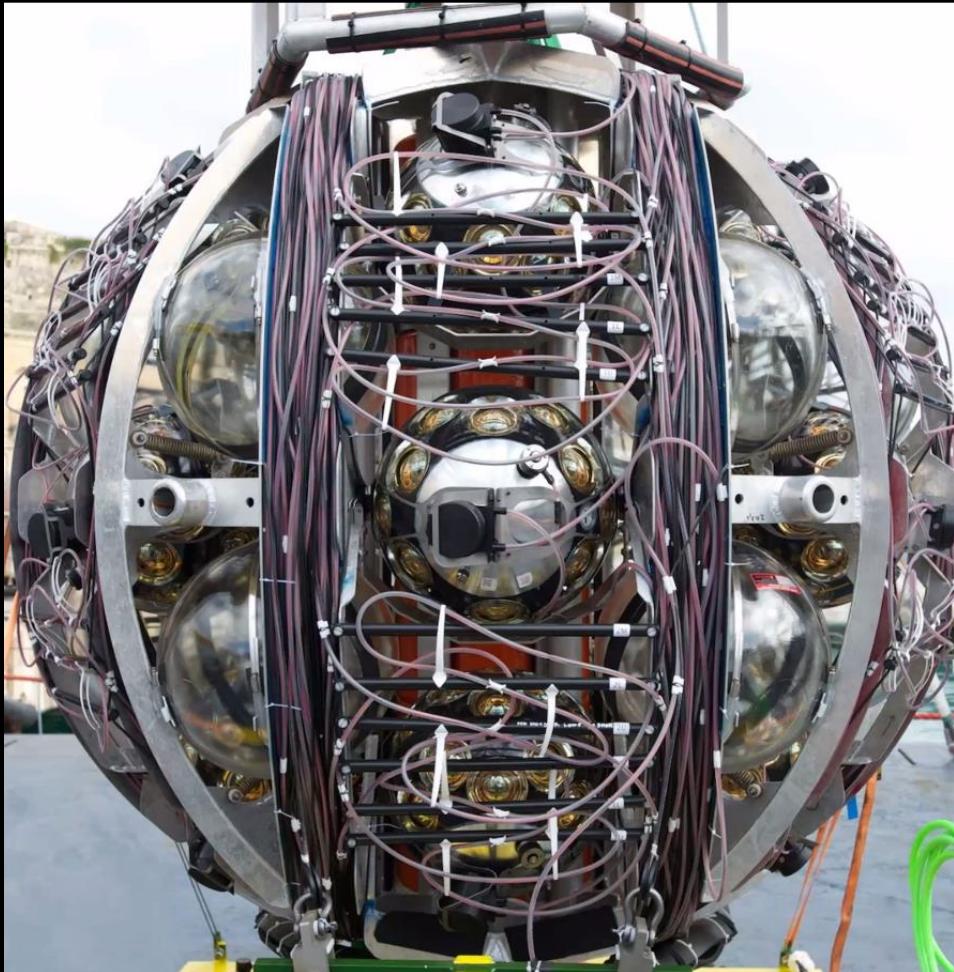
*Chair of Galileo, from which, according to tradition, he gave lectures - Credits: Univ. of Padova - M. Pistore*

## XIX International Workshop on Neutrino Telescopes

18-26 February 2021  
Online  
Europe/Rome timezone

# NeuTel XIX Conference

- [KM3NeT overview](#) by Aart

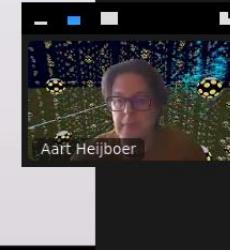


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Status of the KM3NeT neutrino telescope project

Aart Heijboer  
Nikhef, Amsterdam  
On behalf of the KM3NeT collaboration



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## What is Ocean Bottom Detector?

2/5

"Hanohano":detector design  
@Univ. Hawaii 2005

112m x 32m

Transport to the sea by ship and sink to the seafloor at the installation site

In 2019,  
\*JAMSTEC&Tohoku Univ.  
joint research started

\*Japan Agency for Marine-Earth  
Science and Technology

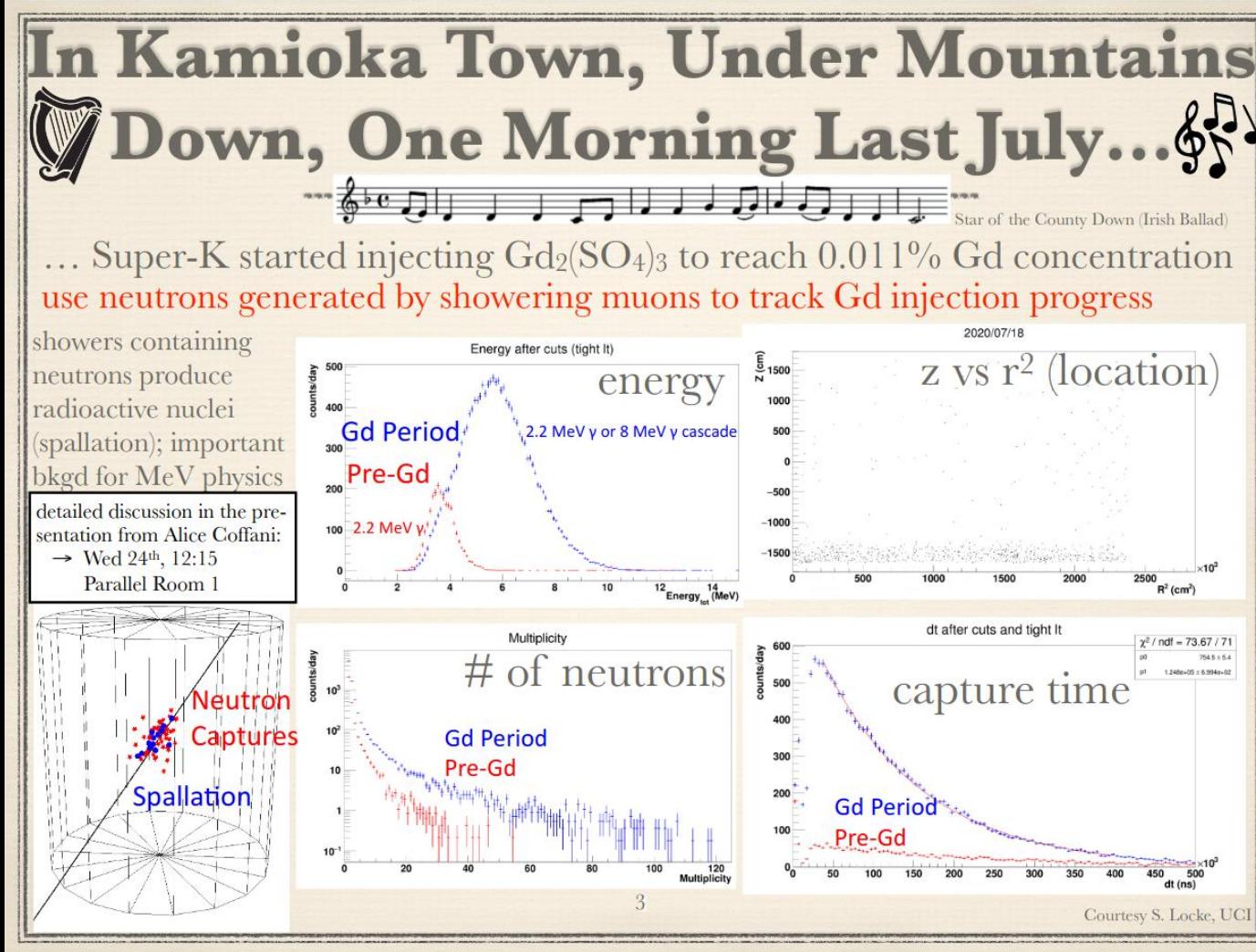
Primary goal: observe mantle geo-neutrino in the sea

- \* Detector size : 10-50 kt (final goal)
- \* Location : 2~5 km deep sea, offshore Hawaii is leading candidate
- \* Period : over 1year/1place

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- [Abyssal scintillation detectors](#)

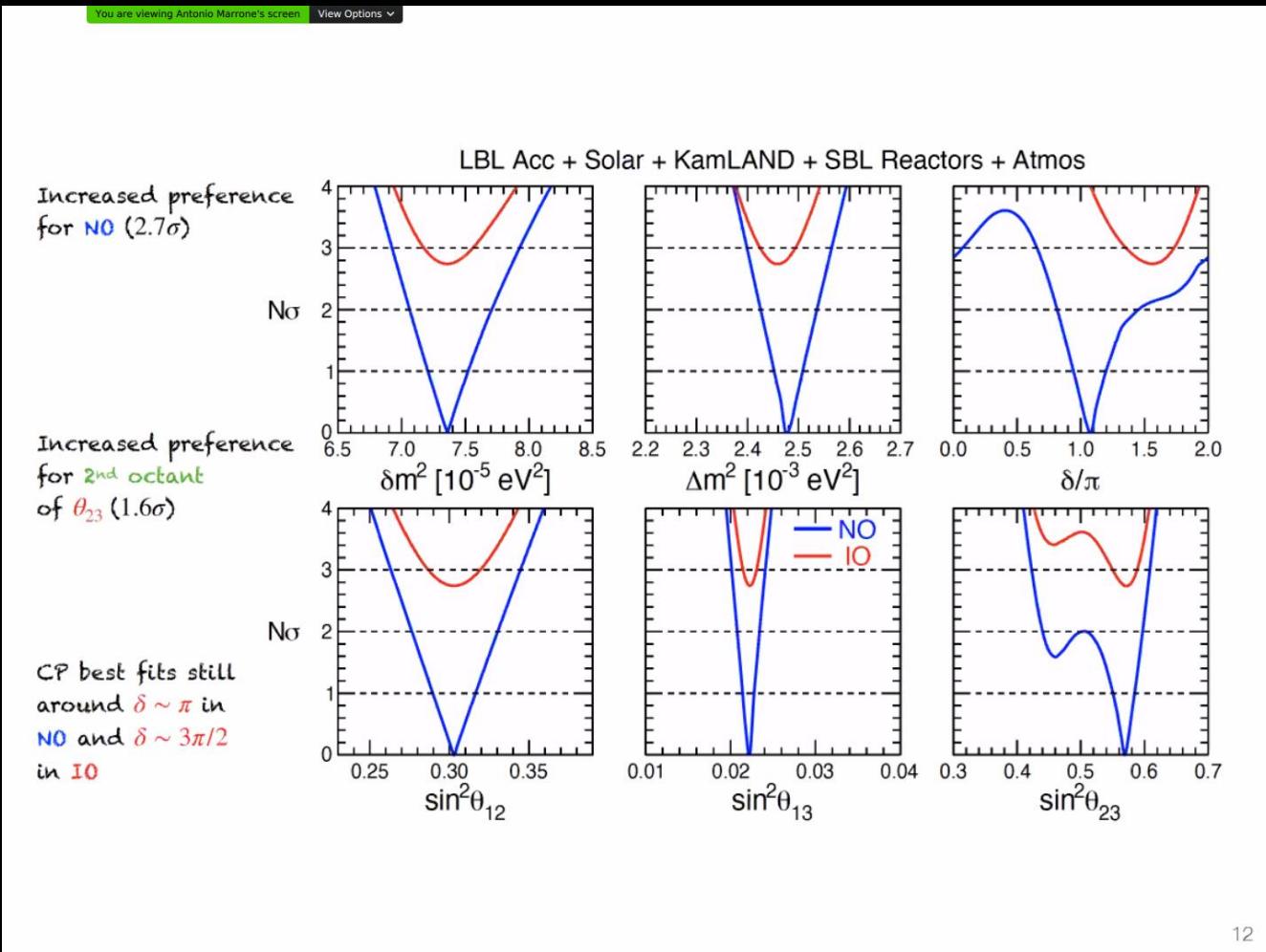


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- [New global oscillation fit results](#)
- Correlations between osc. parameters!



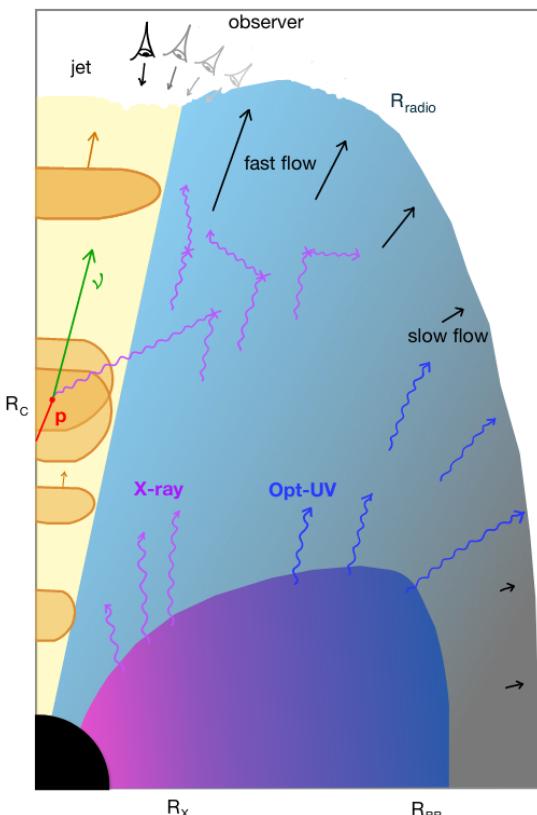
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## Main ideas

The observation of a neutrino from the Tidal Disruption Event AT2019dsg: a concordance model

Cecilia Lunardini

- ① AT2019dsg hosted a jet
  - provides  $\sim 10L_{BB}$  energy, enough for  $\nu$  detectability
- ② backscattered X-rays are targets for  $p\gamma \rightarrow \nu$ 
  - long absorption time scale helps explain late  $\nu$  arrival
- ③ decreasing  $R_C$ 
  - boosts late time  $\nu$  production, helps explain late  $\nu$  arrival



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- Correlations between osc. parameters!

- [TDE coincident IceCube neutrino](#)

- Late detection (150 days after TDE)
- Explained via concordance model
- TDEs might explain  $\sim 26\%$  of neutrino diffuse flux
- Two more TDE coincidences found!

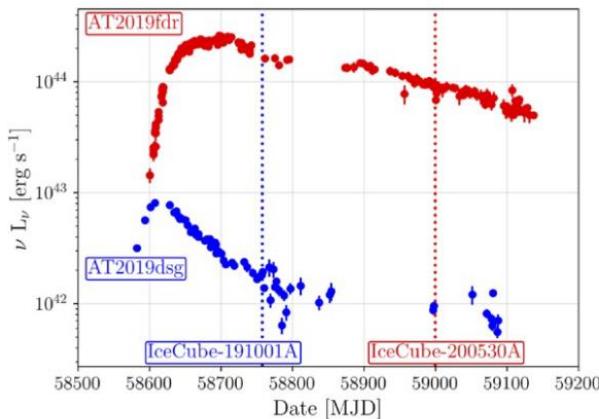
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The observation of a neutrino from the Tidal Disruption Event AT2019dsg: a concordance model

Cecilia Lunardini

## New: a second neutrino-TDE association!

### The search continues...



ZTF has now completed 18 follow-up campaigns to date, out of 57 neutrino alerts from IceCube. Have since found second TDE, AT2019fdr, coincident with IC200530A. See Simeon Reusch's poster! **Lightning rarely strikes twice. Strong evidence of an emerging trend. Second paper in prep.**

DESY | Neutrinos from TDEs | Robert Stein | Cosmic Rays and Neutrinos in the Multi-Messenger Era | 11/12/20

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see also dedicated poster by Simeon Reusch at same conference

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nature astronomy

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Article | Published: 22 February 2021

## A tidal disruption event coincident with a high-energy neutrino

Robert Stein✉, Sjoert van Velzen✉, [...] Yuhan Yao

Nature Astronomy (2021) | Cite this article

417 Accesses | 321 Altmetric | Metrics

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Paper meeting next week