Acoustic neutrino detection

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ACOUSTIC NEUTRINO DETECTION



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→ Sea mammals may mimic neutrino signals

FIBER LASER HYDROPHONES

- Three components:
 - 1. Transducer
 - 2. Optical fibers + fiber laser
 - 3. Interrogator







TOWARDS A NEUTRINO TELESCOPE

Pathfinder Lab measurements Acoustic telescope APOGEIA Echolocating dolphins/whales Reconstructed dive tracks > 100 km3 > 1000 hydrophones Prey layer ~ 2-3 km depth FOH P [mPa] Fish finding echosounder Lakat ... B&K 8101 P [mPa] 05 0 -50.02 1.04 1.06 1.08 1.1 1.12 1.14 1.16 1.18 1.2 t [s]

NO innovation for life

Acoustic Pathfinder:

 Construct a pathfinder with a relative modest number of hydrophones at a depth of > 1 km in the Mediterranean Sea.

innovation

- Improve of the TRL of the fiber optic hydrophone technology.
- Deployment methods
- Upscaling of the read-out system
- 2. Investigate the deep sea state noise.
- 3. Develop new data analysis algorithms, investigate acoustic neutrino performance

SYNERGIES WITHIN APOGEIA

Marine ecology: Acoustic neutrino detection require inpout from marine ecology experts and Earth Sea Sciences.

innovation

- Data analysis and machine learning with GW experiments: filtering a small signal from a hugh background
- Industrialization: An acoustic neutrino detection consists of 1000s of hydrophones, the construction requires an engineering/industrial approach
- **DAS measurements:** Feasibility of an underwater fiber network for DAS measurements.