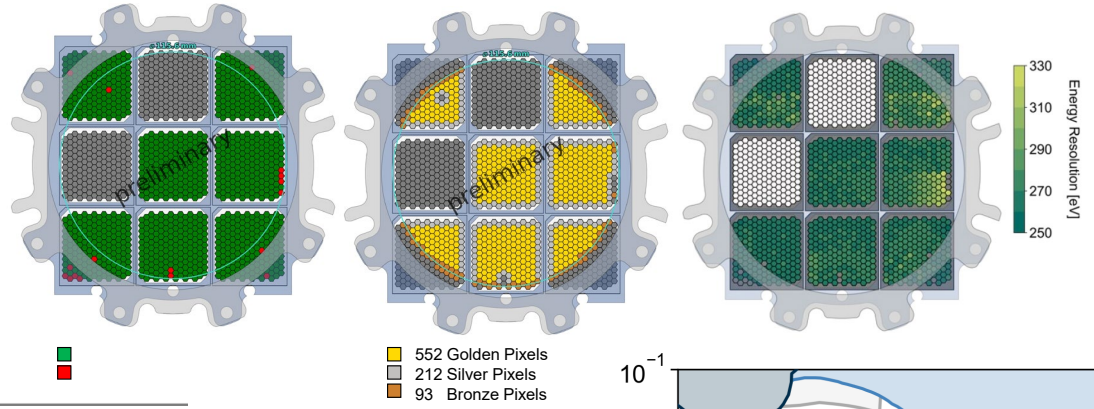
Esperimento: KATRIN_TRISTAN

Responsabile Locale: prof. Marco Carminati (PoliMi)

Scope and Status:

KATRIN (active neutrino mass) data taking has been completed with 1000 days.
Transition to TRISTAN phase (sterile) is ongoing
Some delays in hardware integration



7 of 9 modules are ready.
Undergoing test in *Replica*
1000 pixels ok

Article

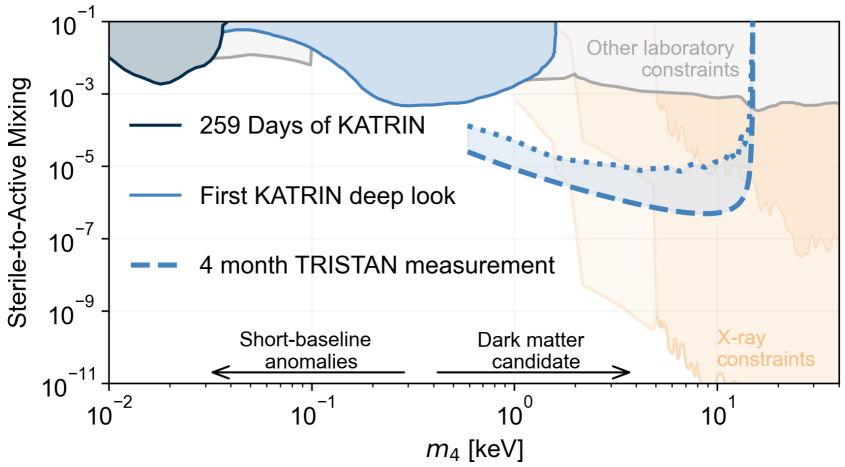
Sterile-neutrino search based on 259 days of KATRIN data

https://doi.org/10.1038/s41586-025-09739-9
Received: 2 April 2025
Accepted: 9 October 2025
Published online: 3 December 2025
Open access
Check for updates

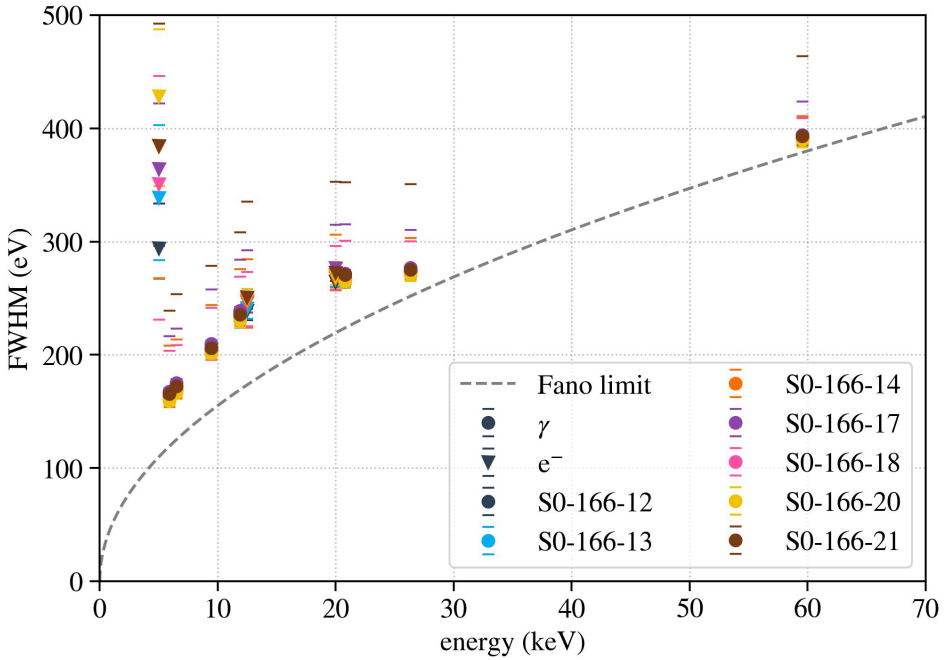
The KATRIN Collaboration*

Neutrinos are the most abundant fundamental matter particles in the Universe and play a crucial part in particle physics and cosmology. Neutrino oscillation, discovered about 25 years ago, shows that the three known species mix with each other. Anomalous results from reactor and radioactive-source experiments[1] suggest a possible fourth neutrino state, the sterile neutrino, which does not interact through the weak force.

Expected exploration of parameters space with TRISTAN

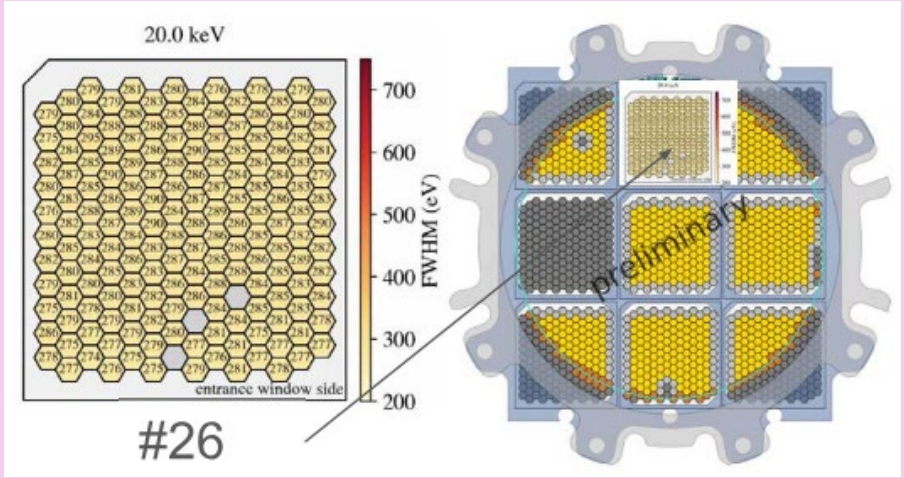


Nome	Afferenza	FTE
Marco Carminati	PoliMi (PA)	1
Alessia Bini	PoliMi (PhD)	1
Leonardo Bernardini	PoliMi (PhD)	1
Korbinian Urban	PoliMi (Postdo)	1
	TOT	4



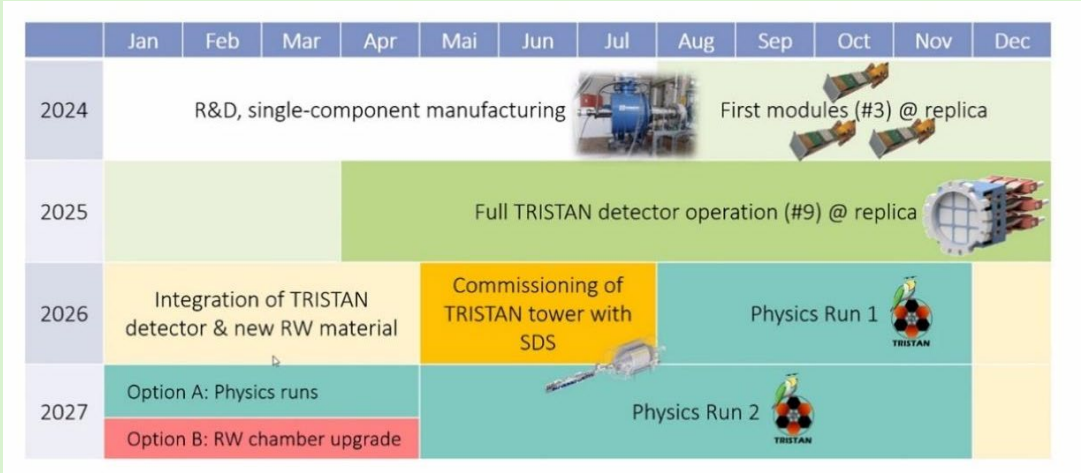
Activity in Milano:

Assembly and test of **in-vacuum electronics.** 30+ ASIC boards assembled and tested. The main challenge is yield across all pixels in several detectors and PCB fabrication (new design to simplify manufacturing of rigid-flex ongoing).



Richieste economiche per il 2027

- Missioni a KIT: 6 k€ (2 meeting x2 + 2 missioni per commissioning x2 1 week)
- Consumo: 15k€ (10k€ per un nuovo rivelatore e 5k€ di cavi flex e schede accessorie)
- Apparati: 0 k€.



~1 year delay, 2026 milestones migrate to 2027

Milestones (MI) 2027:

- Completion of the 9th module and characterization of full array in the Replica System: *end of 2026*
- Production and characterization of 4 more detectors (spares): *early 2027*
- Support to installation and commissioning of TRISTAN array into KATRIN FPD: *mid 2027*