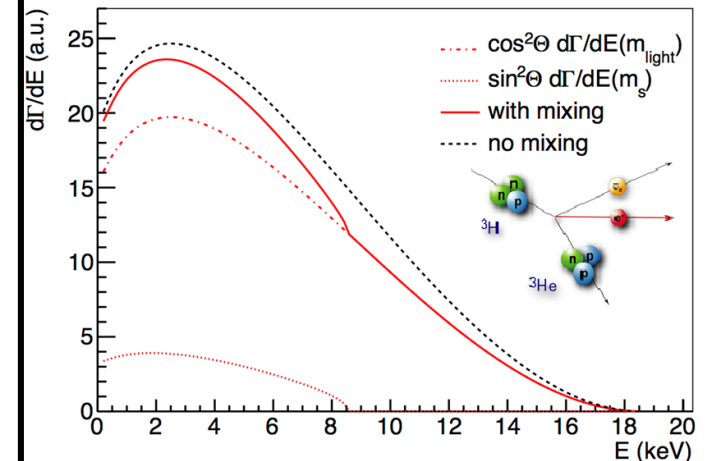# SDD prototypes with the IDef-X readout for the keV-scale sterile neutrino search with TRISTAN and analysis of first tritium data
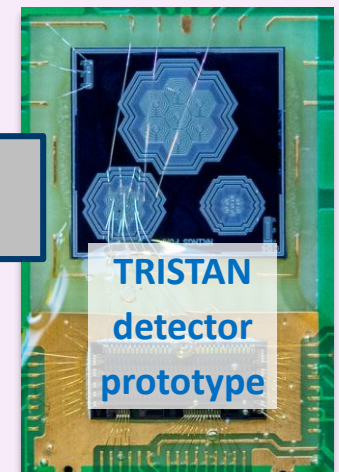
Konrad Altenmüller, TUM

- **keV-scale sterile neutrino** (dark matter) search as an expansion of **KATRIN** → the **TRISTAN** project

- Observe the signature of the heavy mass-eigenstate mixing in the tritium beta spectrum

- KATRIN cannot scan the spectrum at low energies because the electron flux is too high → **new detector**

- Measurements at **Troitsk ν-mass** with detector prototypes: **characterization, development of analysis tools, first tritium data**
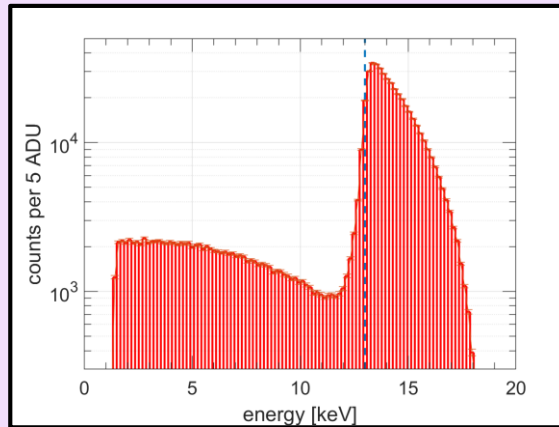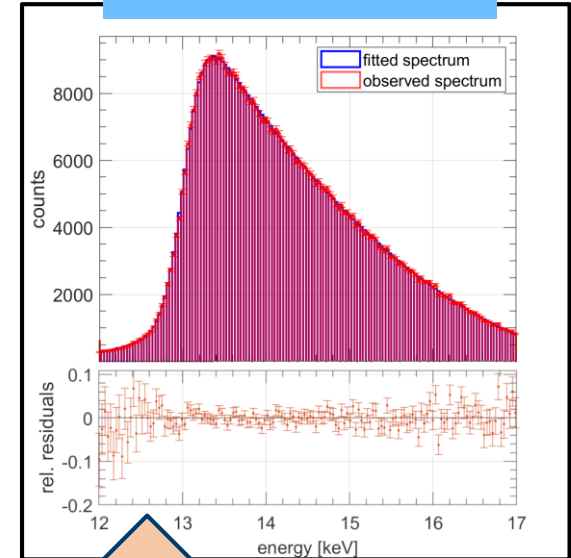
sterile neutrino signature

Troitsk ν-mass

pumping and transport section

MAC-E filter

gaseous tritium source

TRISTAN detector prototype

How to analyze the tritium spectrum?

Observation

observed tritium spectrum HV = 13 kV 13.8 h measurement time 540 000 events, 11 cps
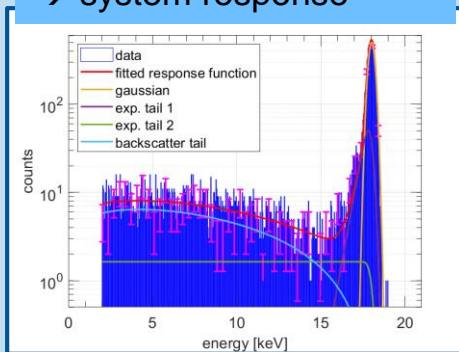
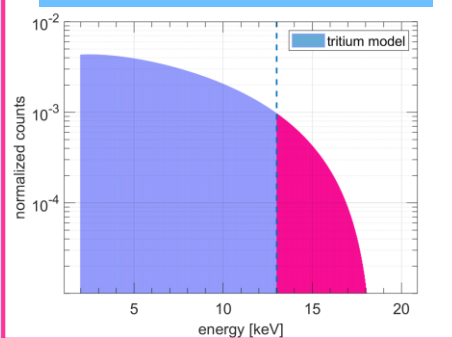

Fit

✳ convolution and fit

Ingredients

measurements of monoenergetic electrons → system response
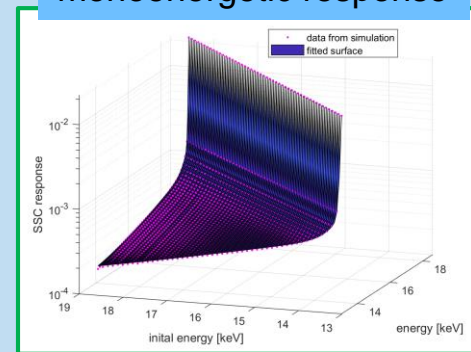

→ parameters with (co)variance

tritium model

→ sterile neutrino parameters

simulation of effects not accounted for by the monoenergetic response

→ validation with measurements