^{214}Pb BRANCHING RATIOS MEASUREMENT WITH XENONnT

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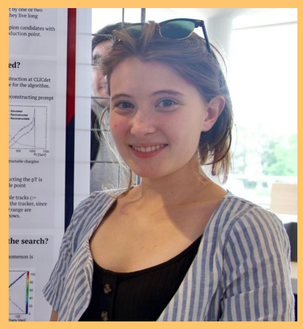
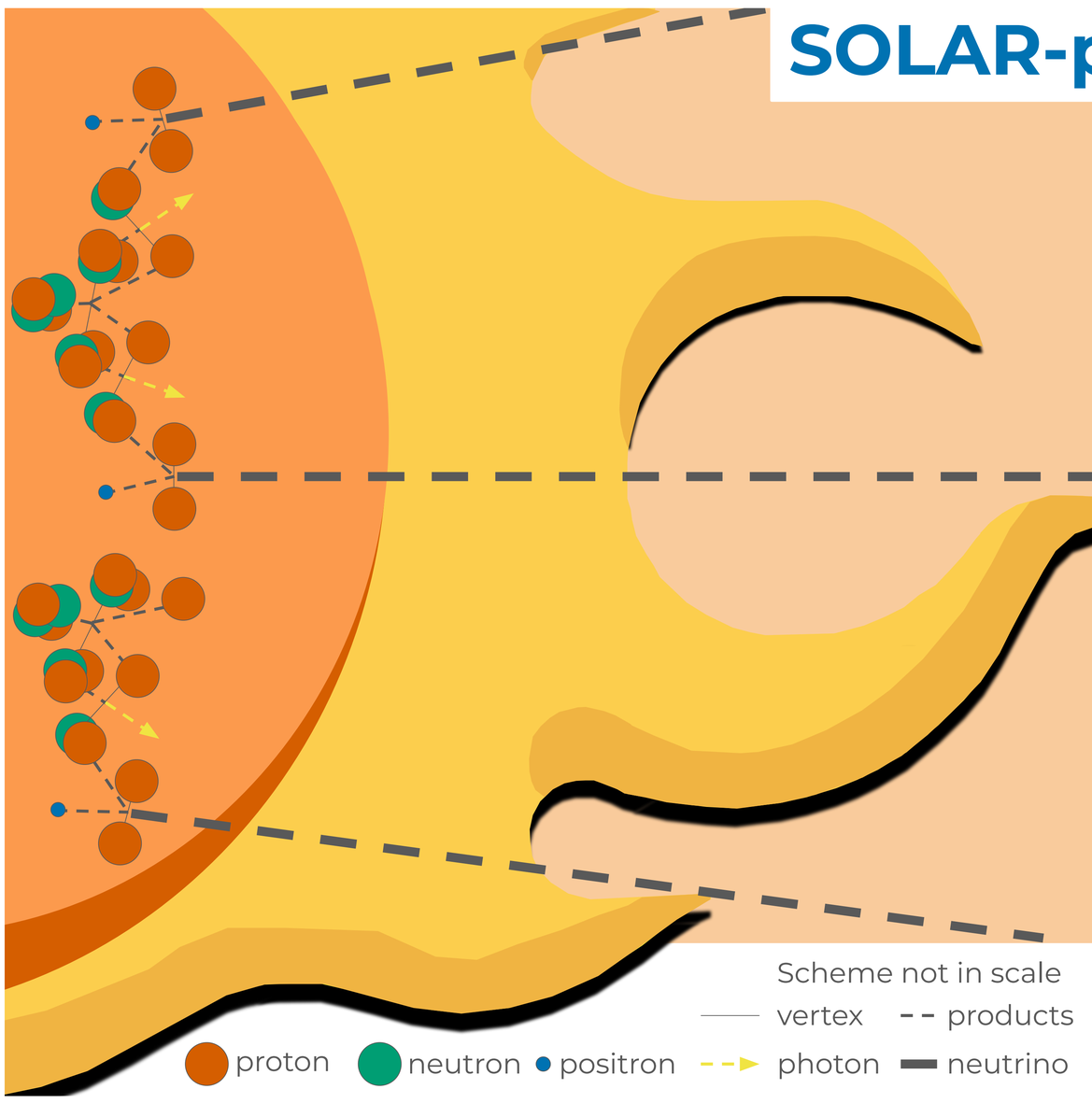
On behalf of the **XENON** Collaboration



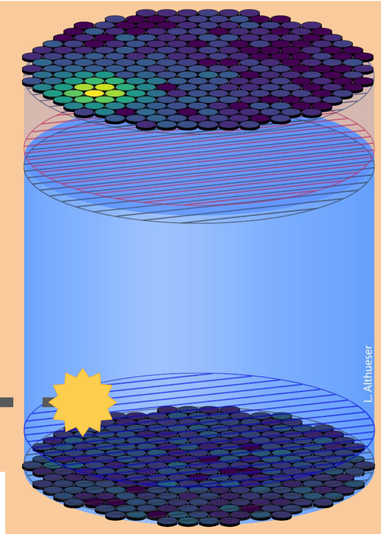
^{214}Pb ground state branching ratio represents the major systematic to the Solar-pp neutrinos flux measurement with XENONnT. We present a novel technique to reduce this uncertainty.

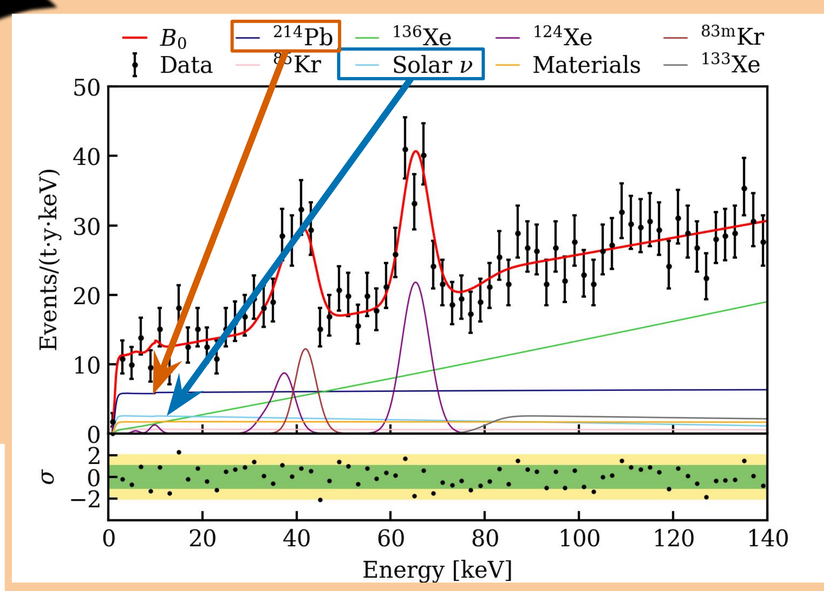
SOLAR-pp NEUTRINOS WITH XENONnT



The XENONnT experiment can update the measurement of the Solar-pp neutrinos flux, by exploiting its very **low energy threshold** of about 1 keV.

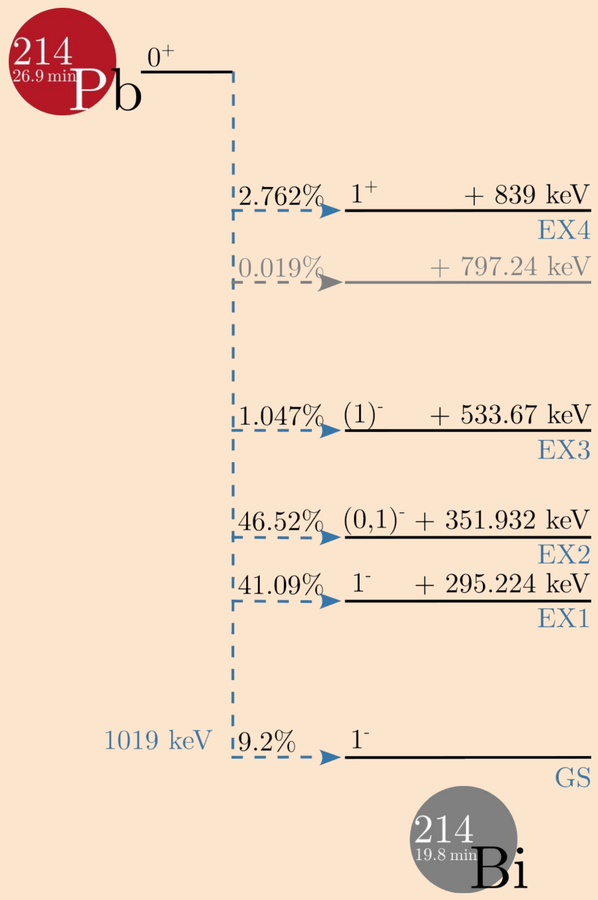
This study requires **high precision in background model** construction.





Even constituting a **sub-μBq/kg contamination, ^{214}Pb** is responsible for the largest **systematic uncertainty** to the Solar-pp neutrinos searches.

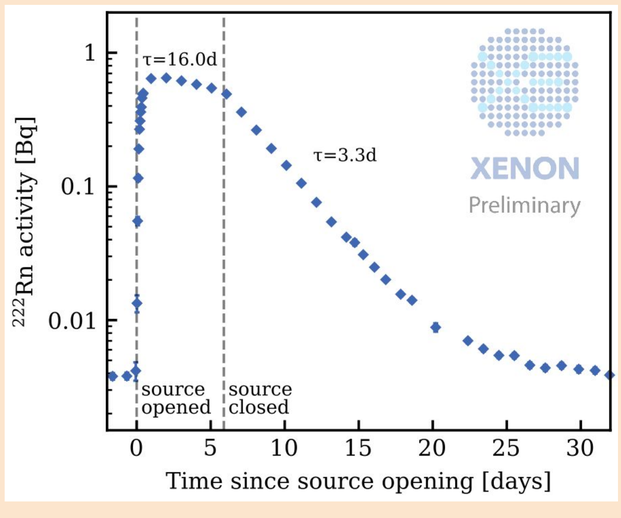
2 ^{214}Pb BACKGROUND FOR ν SEARCHES



For matters of **time resolution,** just ^{214}Pb decaying to ^{214}Bi **ground state** (GS) contributes to the energy region of interest of XENONnT Solar-pp neutrino searches.

However, this **branching ratio** is reported in literature with a **large relative uncertainty** (**7-11%**) that introduces a likewise systematic for Solar-pp neutrinos flux measurement.

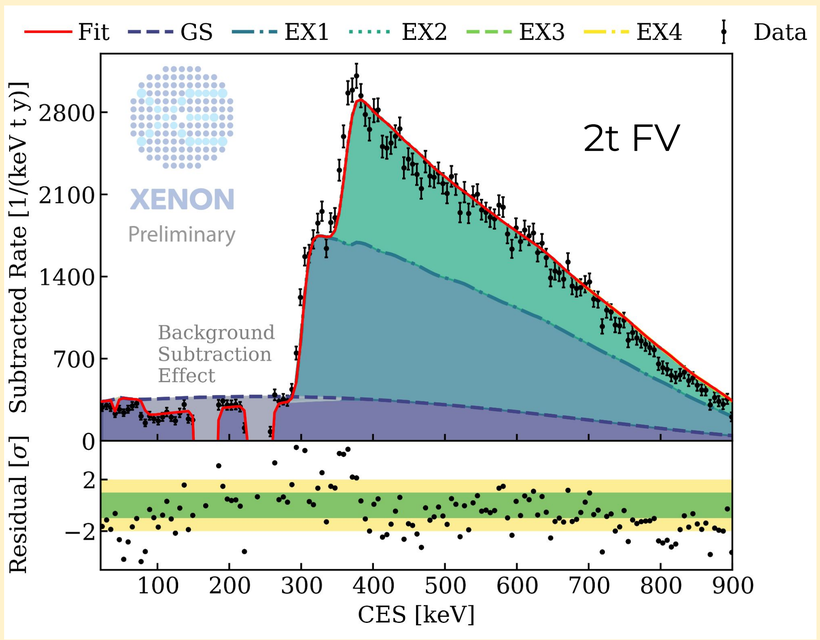
Sensitivity studies, exploiting only 2t of fiducial volume (FV), showed that with just **7 days of ^{222}Rn calibration** campaign XENONnT could have updated this measurement.



3 ^{214}Pb BRs MEASUREMENTS METHOD

^{222}Rn calibration data can be **cleaned by subtracting** bin-by-bin the science data collected for WIMP searches, hence removing every constant background component.

^{214}Pb branching ratios measurement can then be performed via **signal and background models fit**.



The **results** are still **very preliminary** and indicate the need of further investigation in the energy scale definition and in the cut efficiency computation.

The **relative statistical uncertainty for the ground state branching ratio of ^{214}Pb beta decay** results to be about **2%**

CONCLUSIONS AND OUTLOOK

An **optimization** study for the fiducial volume definition may **reduce it even further**.