MAGIX

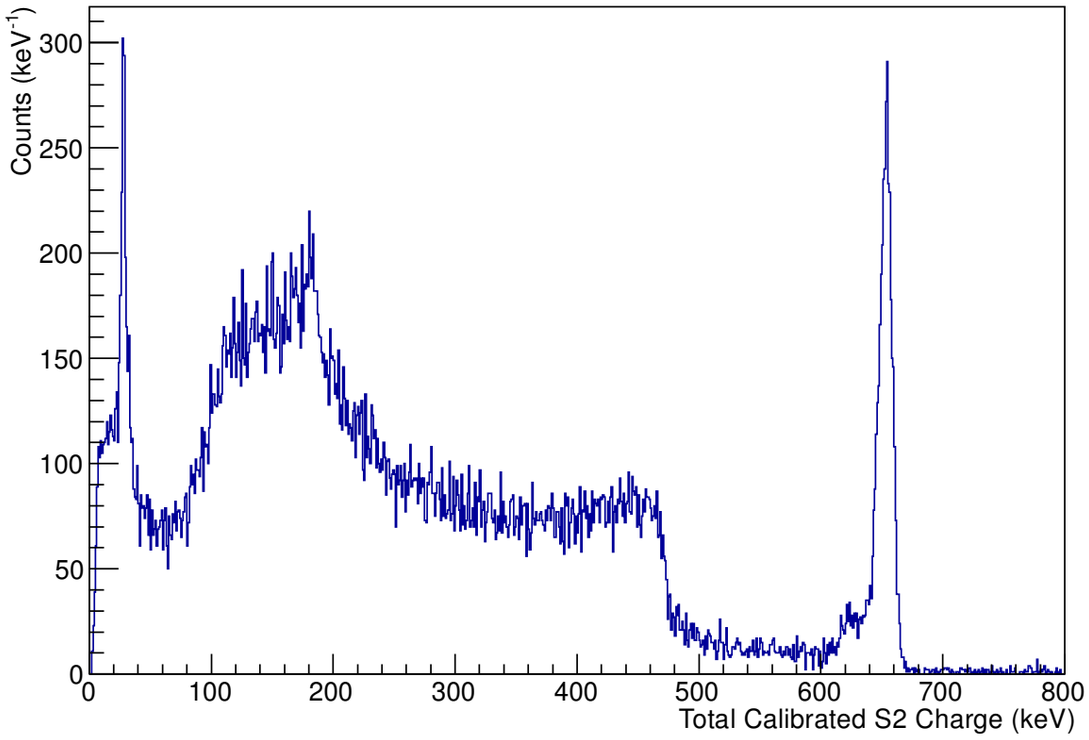
Dave & JJ

WHAT IS MAGIX

- MAjorana Gas detector Instrumented with Xenon.
- Ton scale HPXe TPC for bb0nu and DM searches.
- NEXT, a 100 kg HPXe TPC used as springboard of MAGIX.
- Guaranteed huge discovery potential for bb0nu based on energy resolution and large background suppression rate (due to topological signature).
- Opens up the intriguing possibility to measure directionality using columnar sensing, as proposed by DN.

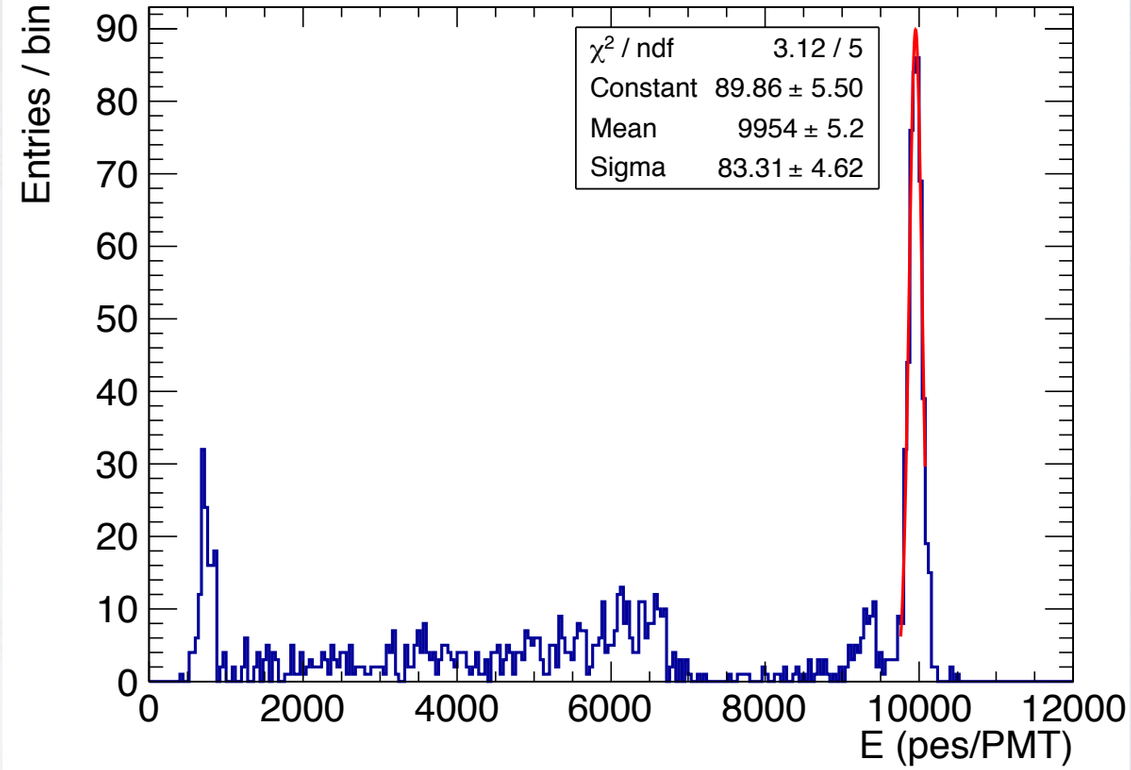
ENERGY RESOLUTION

Energy, 662 keV gammas from ^{137}Cs in NEXT-DBDM



0.5% FWHM at Qbb in central region

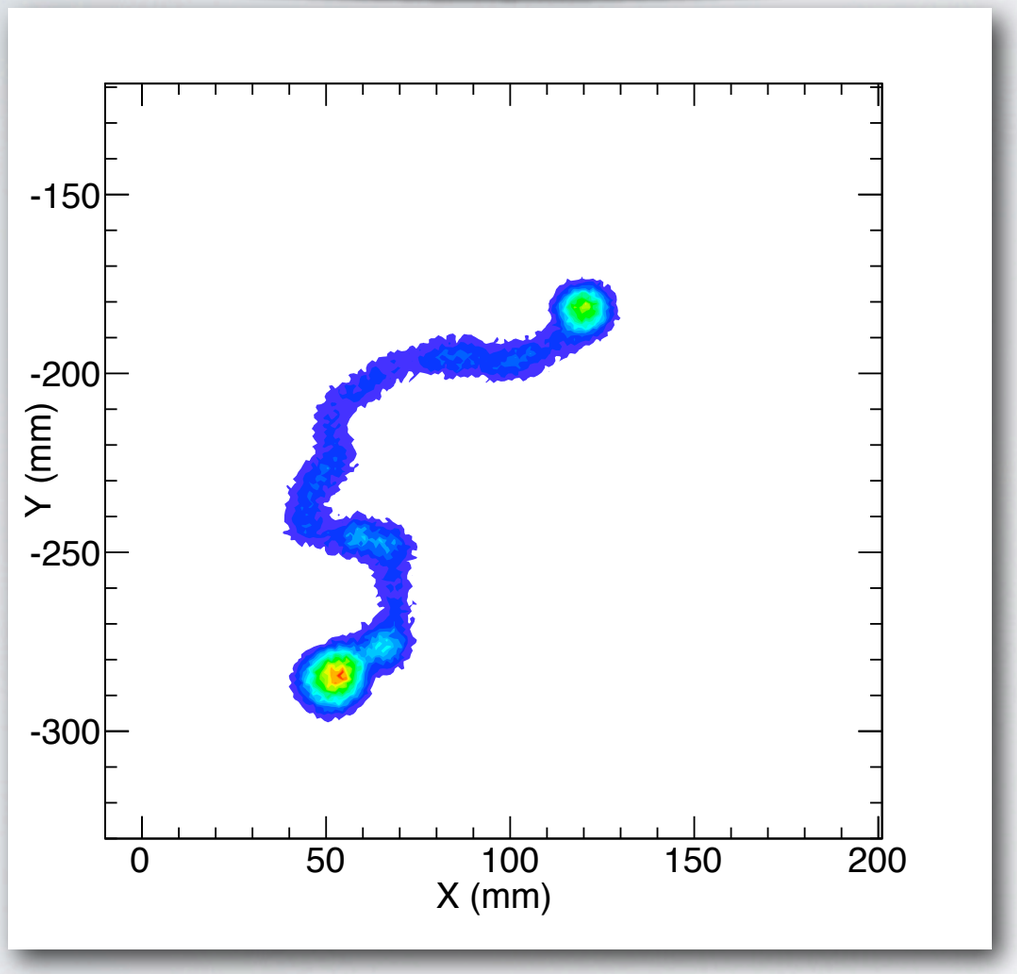
Energy, 511 keV gammas from ^{22}Na in NEXT-DEMO



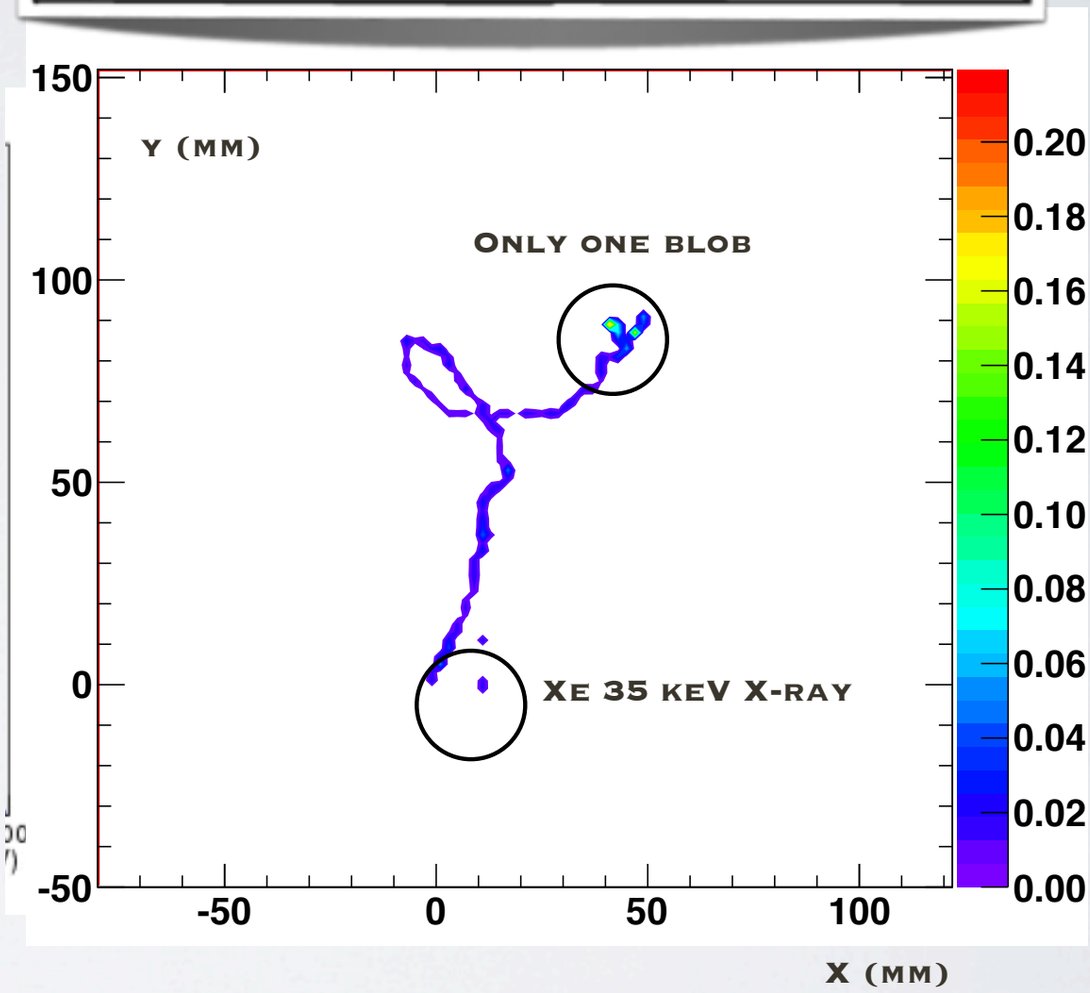
0.8% FWHM at Qbb in full fiducial

TOPOLOGICAL SIGNATURE

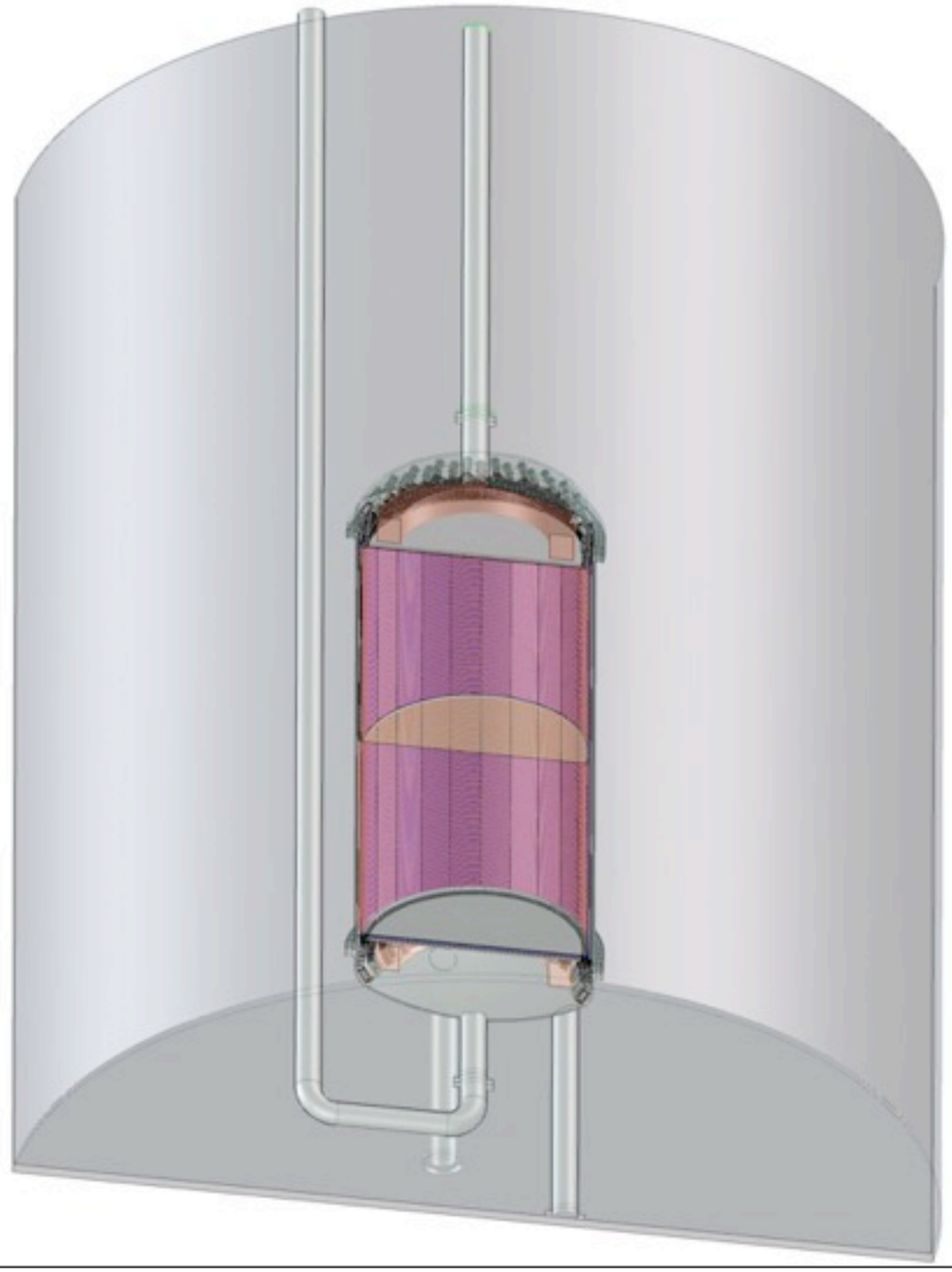
Signature of a bb0nu event: 2 blobs no satellite



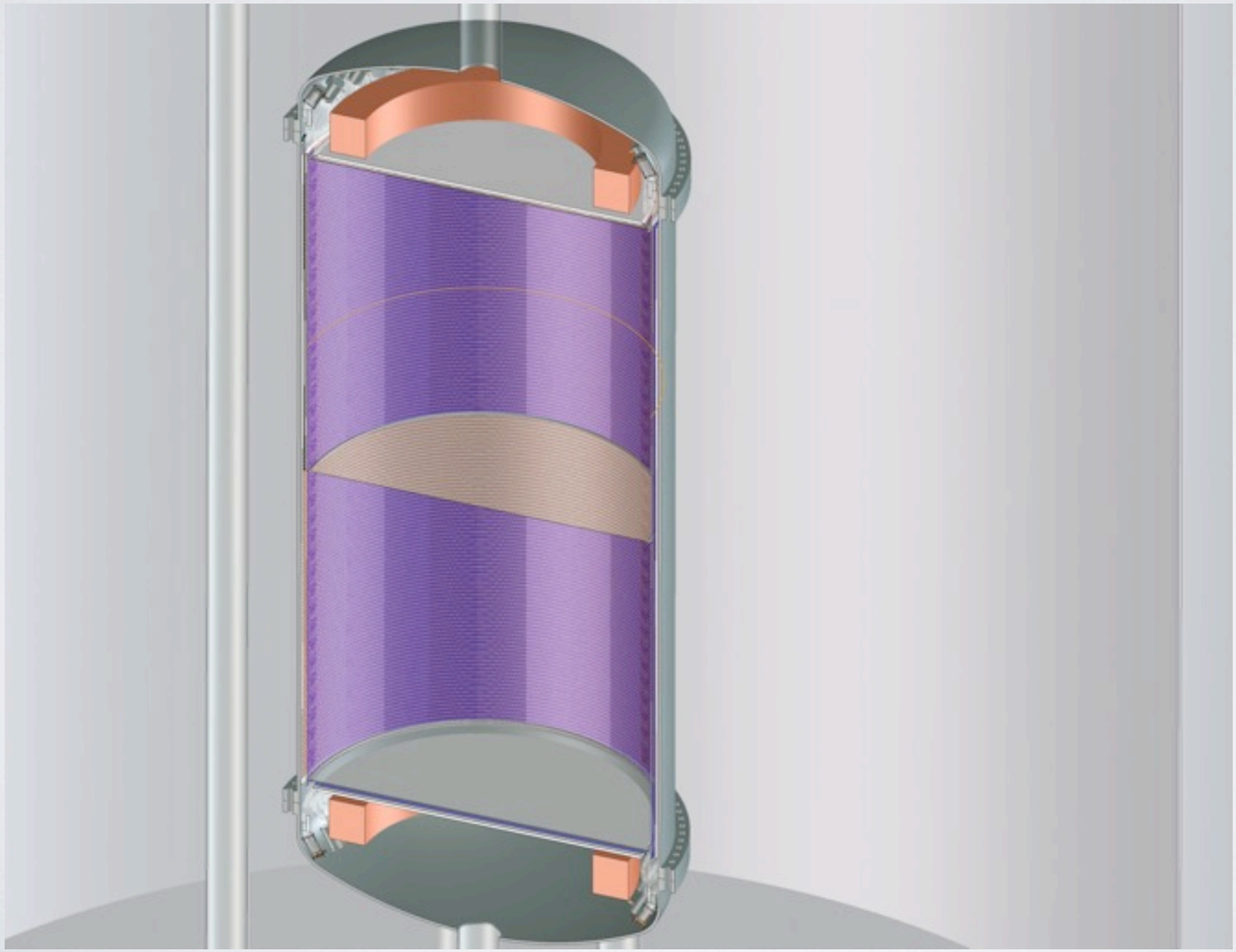
Signature of a background event: 1 blob X ray



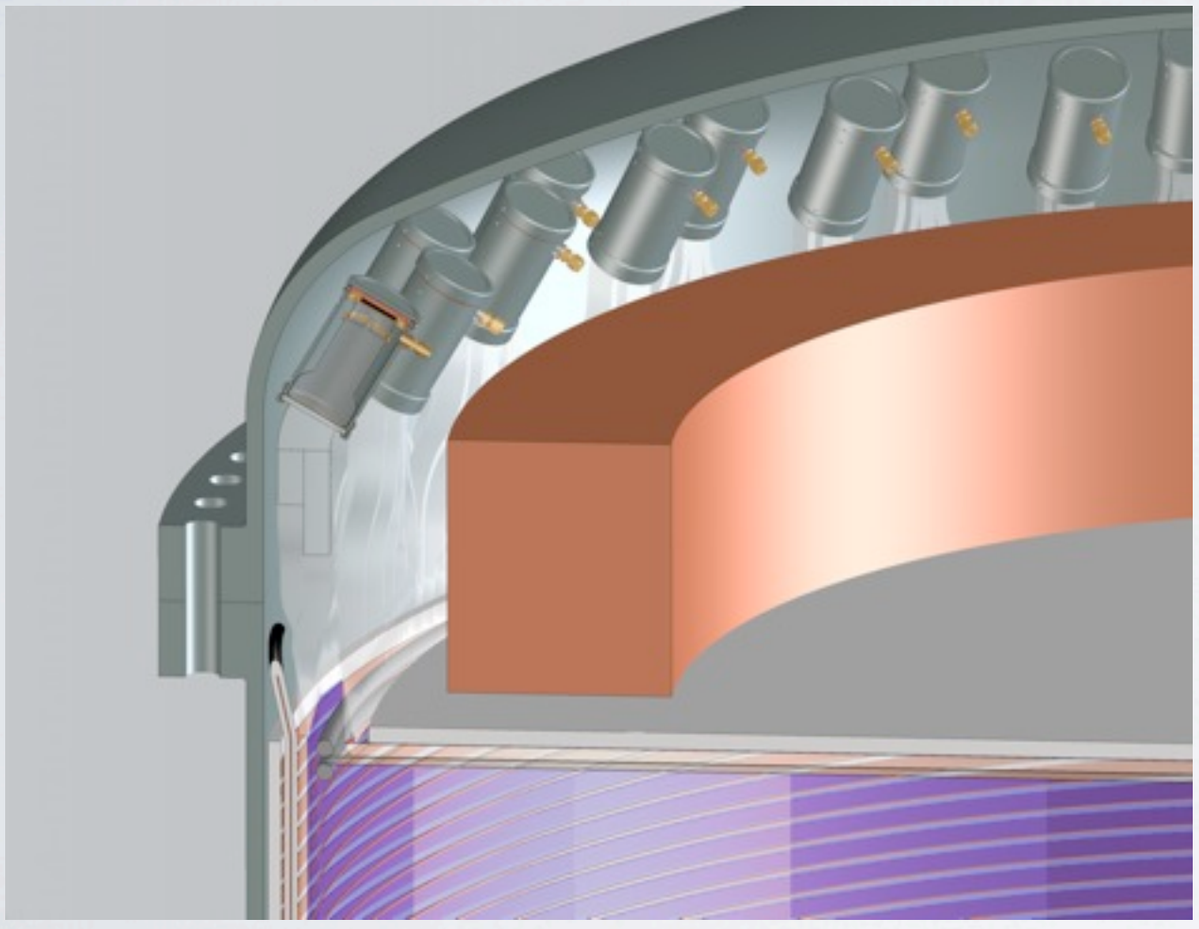
DETECTOR IN WATER TANK

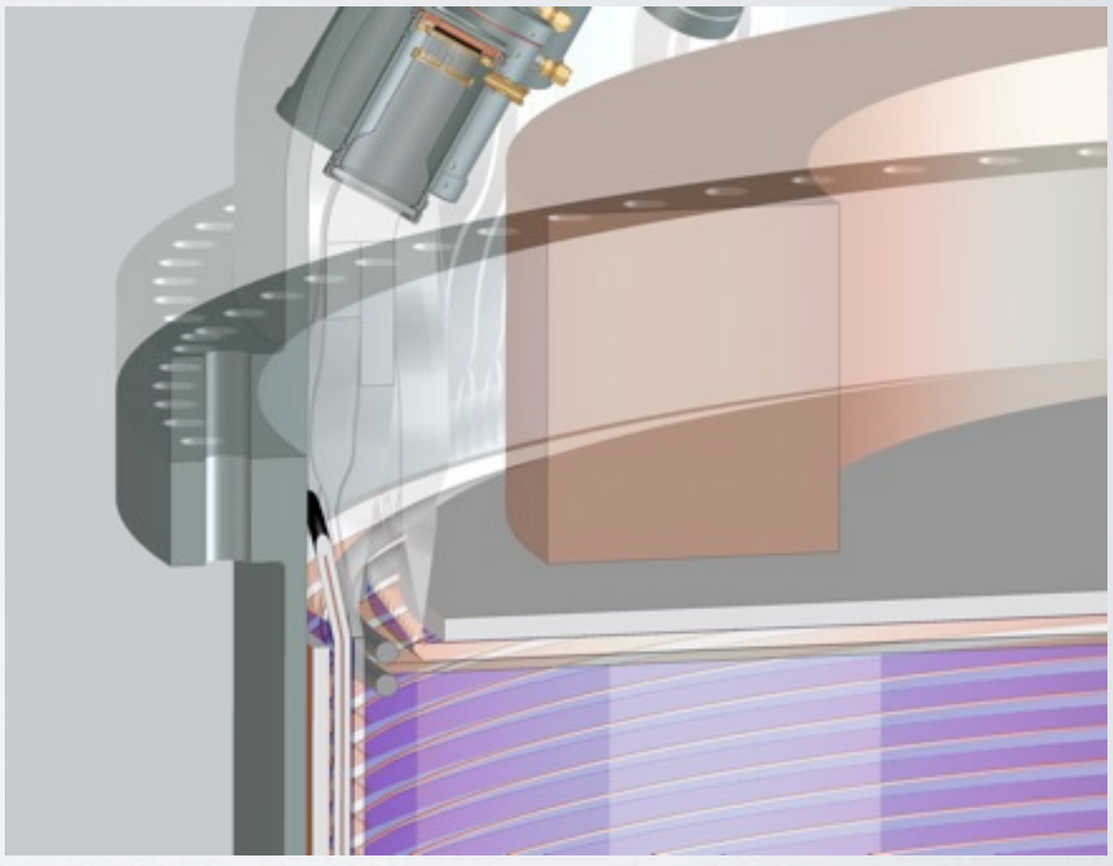


SYMMETRIC APPARATUS



BARREL ENERGY SYSTEM

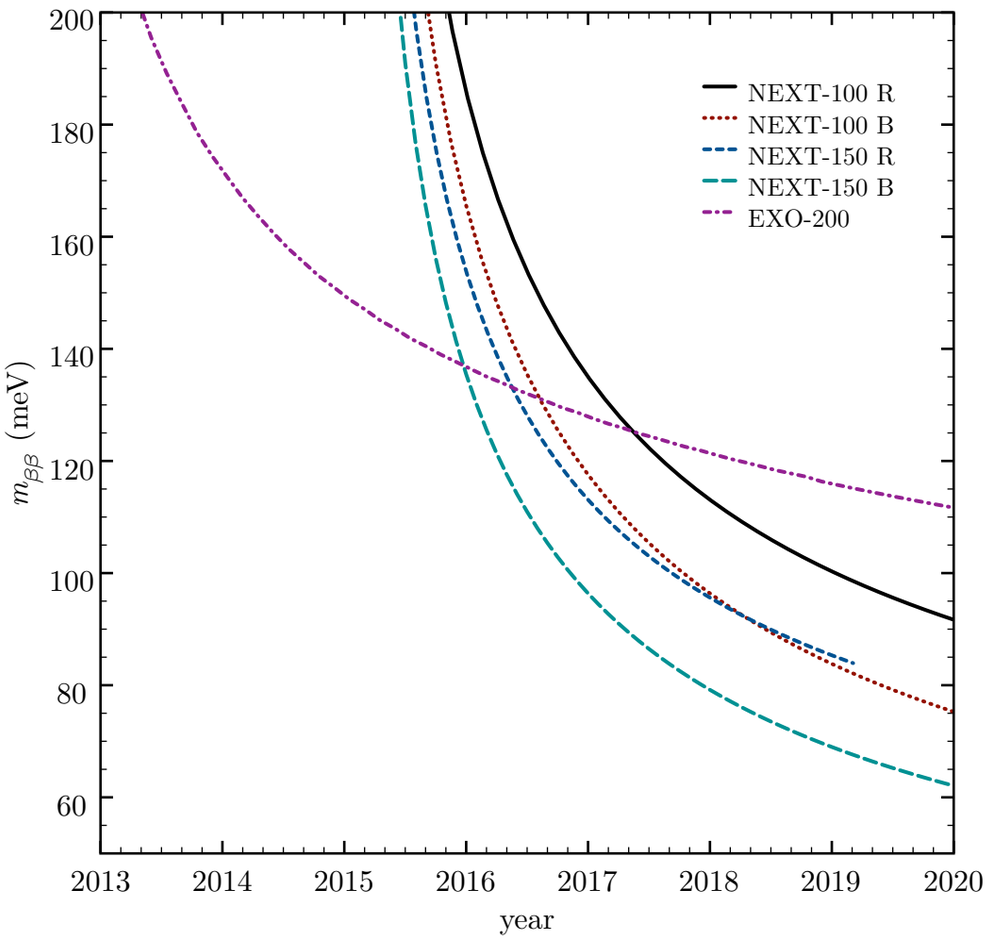


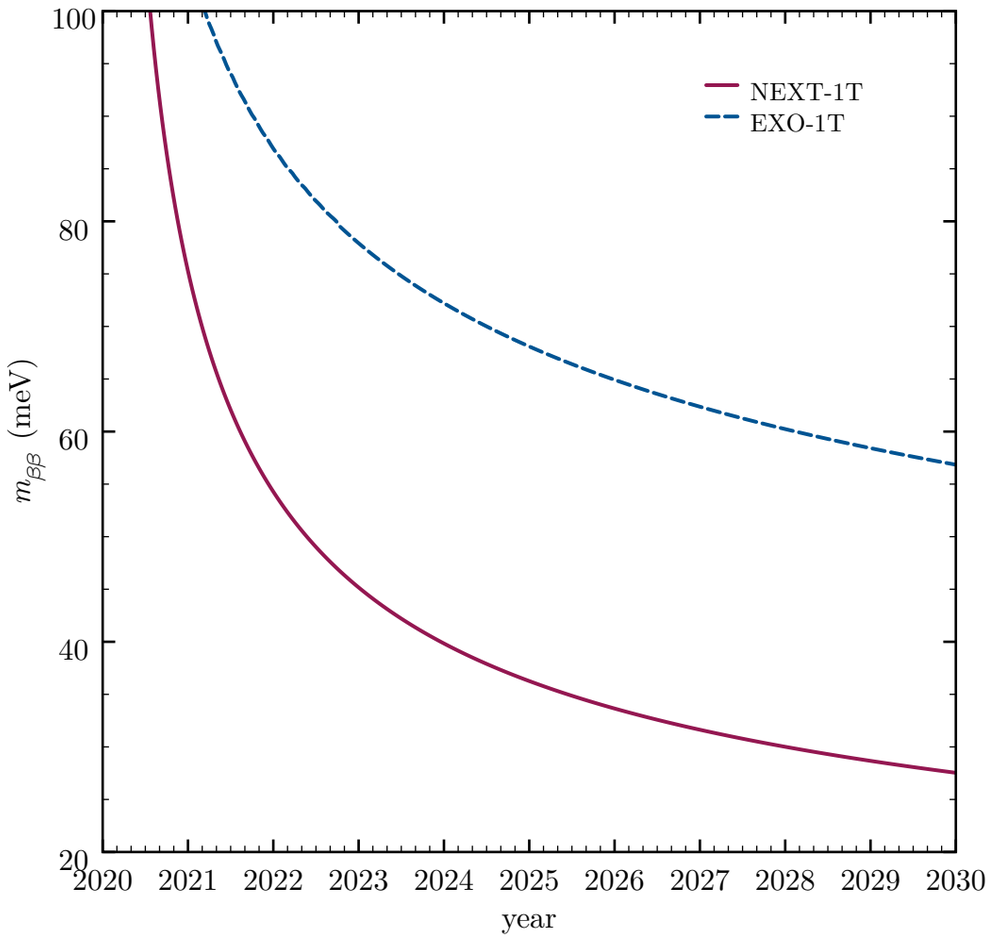


R: 1.0 % FWHM 0.8 10^{-4} ckky
I: 0.5 % FWHM 0.5 10^{-4} ckky

Notice that NEXT with 150 kg achieves a sensitivity two times better than EXO in mass. It takes only one year to "catch" EXO in the best case.

NEXT demonstrates the case for MAGIX. The one-ton scale is spectacular (Sinclair got very edgy with the 1-ton plot)





R: 1.0 % FWHM 0.8 10^{-4} ckky
I: 0.5 % FWHM 0.5 10^{-4} ckky

Notice that NEXT with 150 kg achieves a sensitivity two times better than EXO in mass. It takes only one year to "catch" EXO in the best case.

NEXT demonstrates the case for MAGIX. The one-ton scale is spectacular (Sinclair got very edgy with the 1-ton plot)