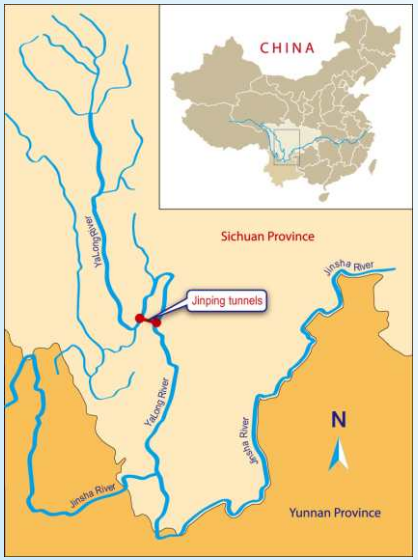
Symposium Summary
a first attempt
after all it is not over !



Beijing, 26.3.2011

I.Abt, MPI München

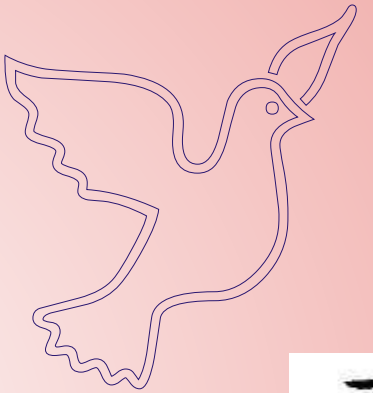
Danke

for coming, for the interesting talks,

for the lively discussions

for the hospitality

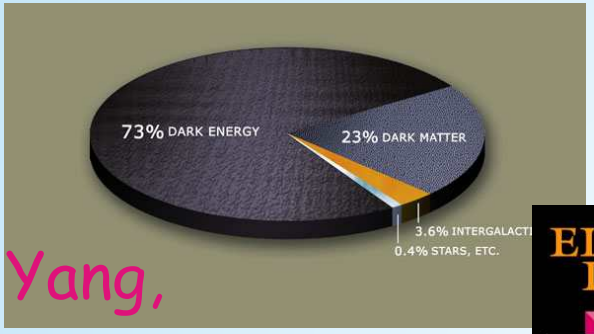
DISCLAIMER



I apologize for all misinterpretations, omissions, wrong quotation, and general misunderstandings.

Any opinion expressed is mine and you should blame only me.

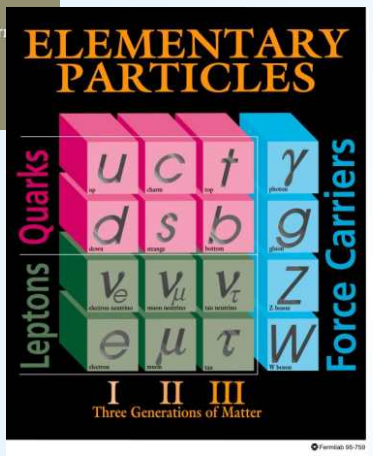
Goals and Means



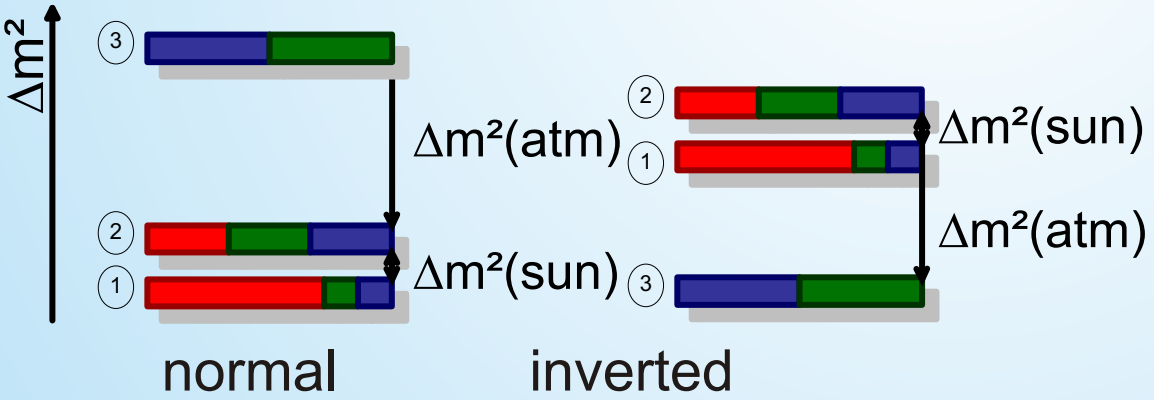
Yang, Changgen

Physics goals and technology have to be brought together.

和 **Harmony**

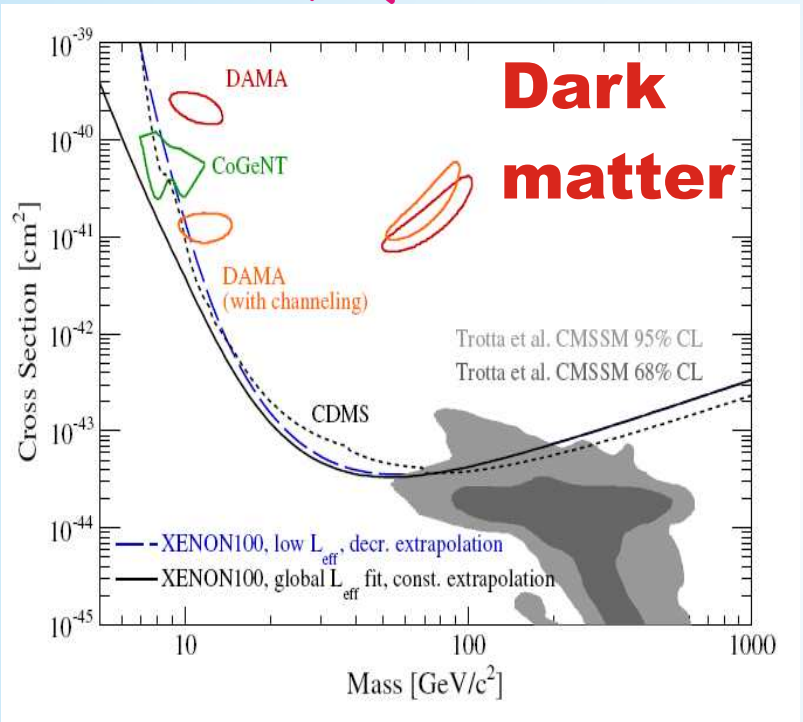


Wang, Yifang

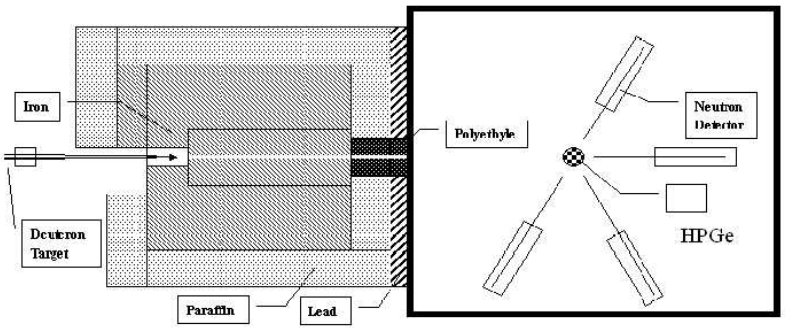


Example of Importance of Technology

Yue, Qian



The quenching factor in germanium is important to interpret the data.



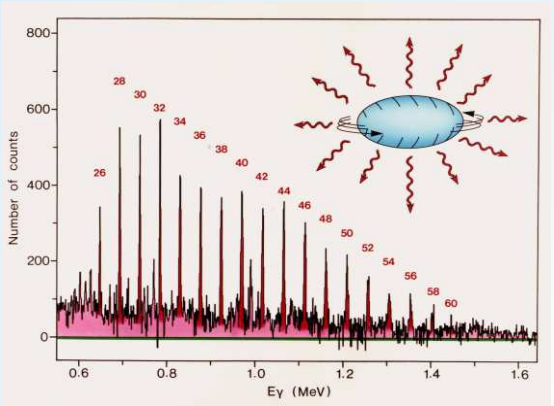
Ruan Xichao's Talk

The final message depends on the understanding of the tool. This is physics too!

Goals

Deformed Nuclei

Juergen Eberth

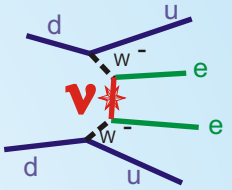


Neutrinos

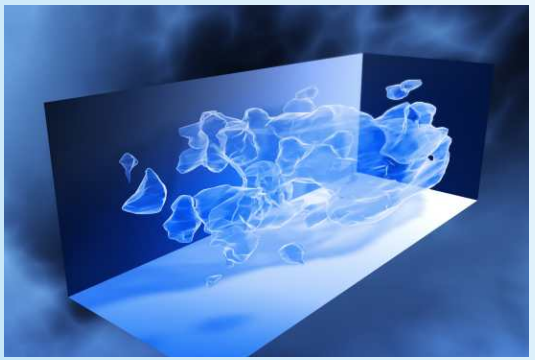
mass scale

hiercharchy

mixing θ_{13} Cao,Jun

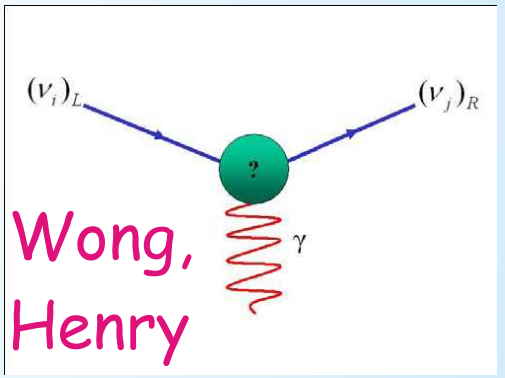


Dark matter



Many possibilities

Zhou, Yufeng

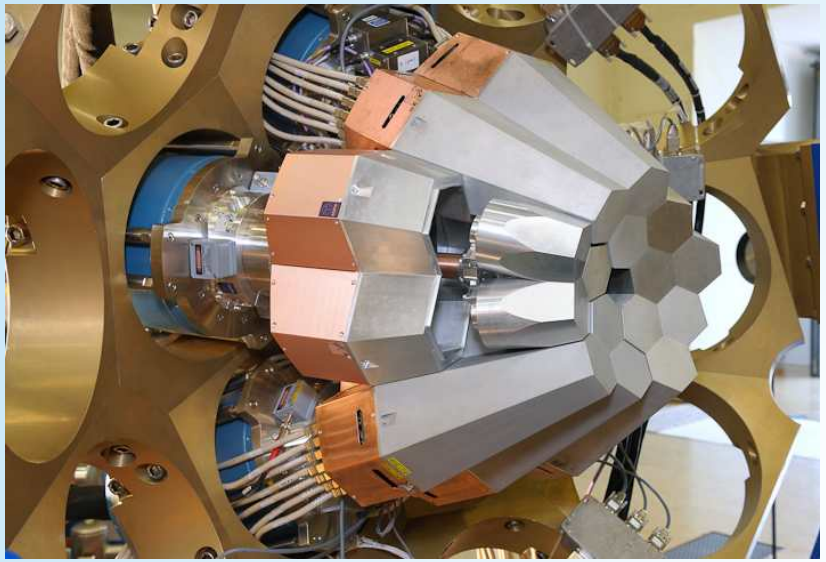


Wong, Henry

coherent sacttering

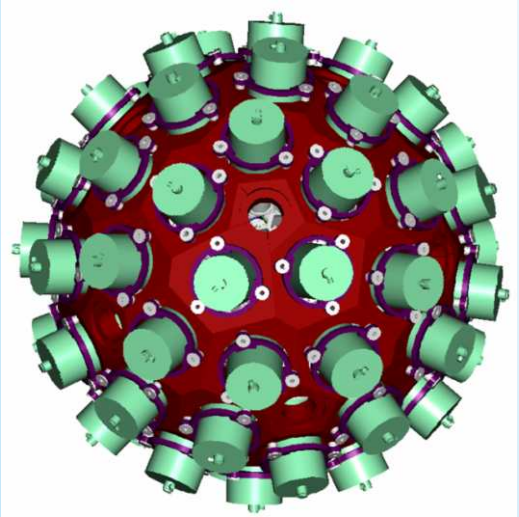
magnetic moment

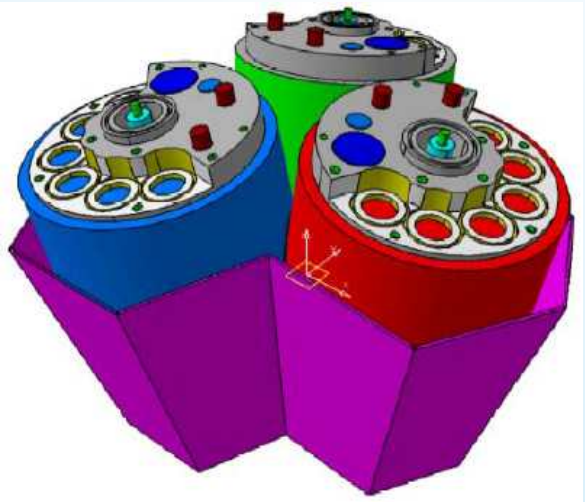
Technology



180 hexagonal crystals	3 shapes
60 triple-clusters	all equal
Inner radius (Ge)	23.5 cm
Amount of germanium	**362 kg**
Solid angle coverage	82 %
36-fold segmentation	6480 segments
Singles rate	~50 kHz

Efficiency:	43% (M_γ=1)	28% (M_γ=30)
Peak/Total:	58% (M_γ=1)	49% (M_γ=30)





AGATA

Juergen Eberth

very advanced technology and huge mass

Germanium Detectors

planar
true coaxial
coaxial
point contact

n-type
p-type
segmented
non segmented

What do you want most?

homogenious electric field, energy resolution, energy threshhold, position resolution, ultra low background, robustness, low price, serial production

The egg-laying woolly Ge milk-pig

= one size/technology fits all

threshhold of 20 eV

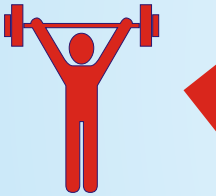
perfect separation of multi/single-site

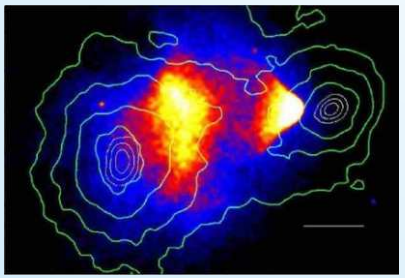
position resolution 1mm

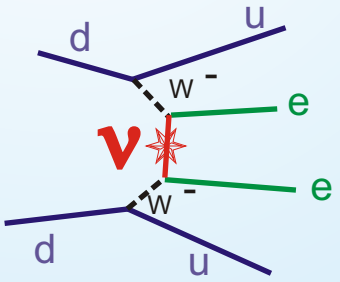
separation of gamma and neutron

energy resolution 1keV at 1MeV

no contamination: bulk and surface







Importance of Read-Out

=

+

System

家

Detector

Could the detector absorb electronics?

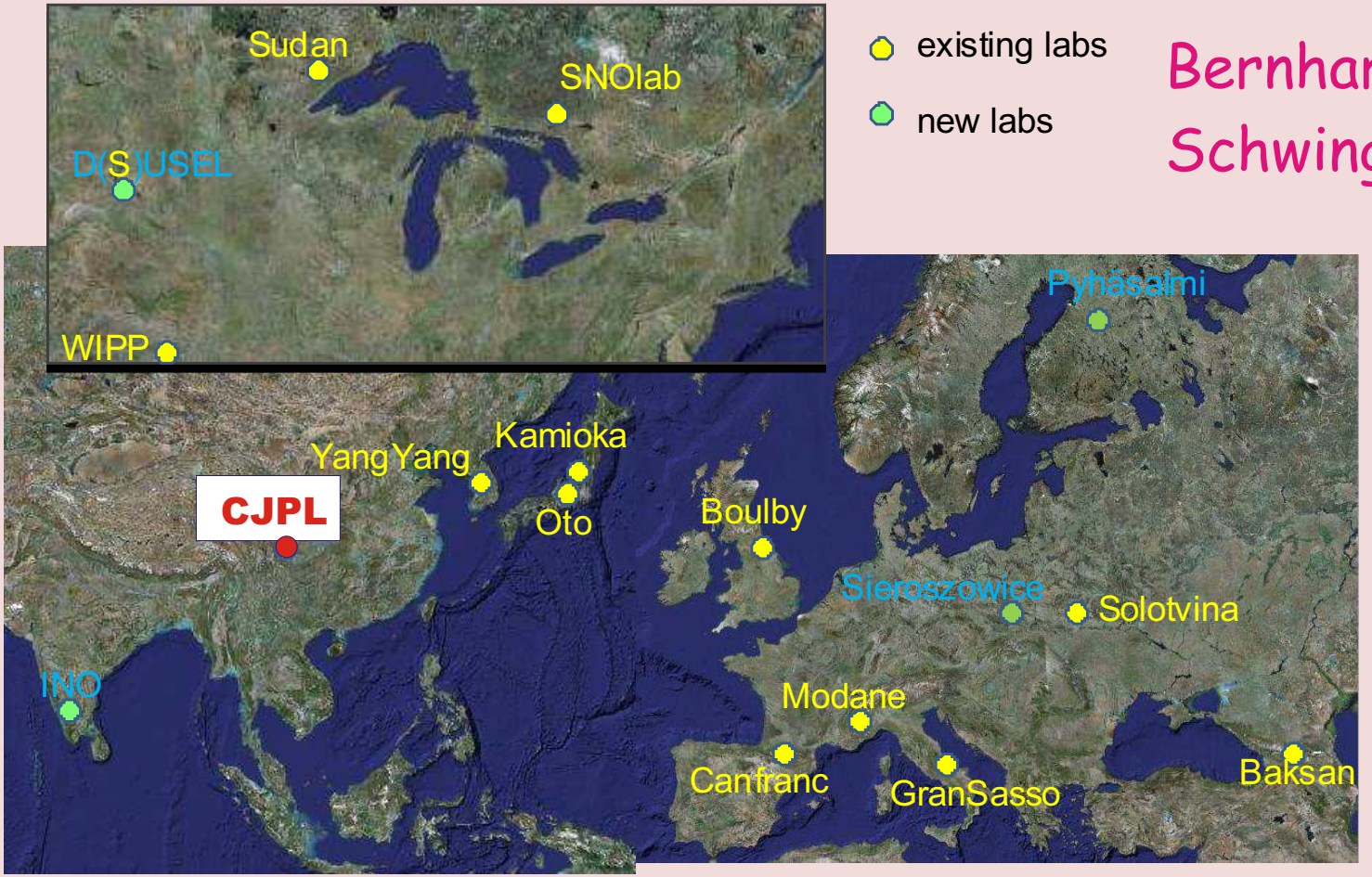
Electronics

low mass asic
Ge transistor
zero mass cable
perfect bandwidth

lively discussion
some interesting ideas

Finding a home

Lab locations



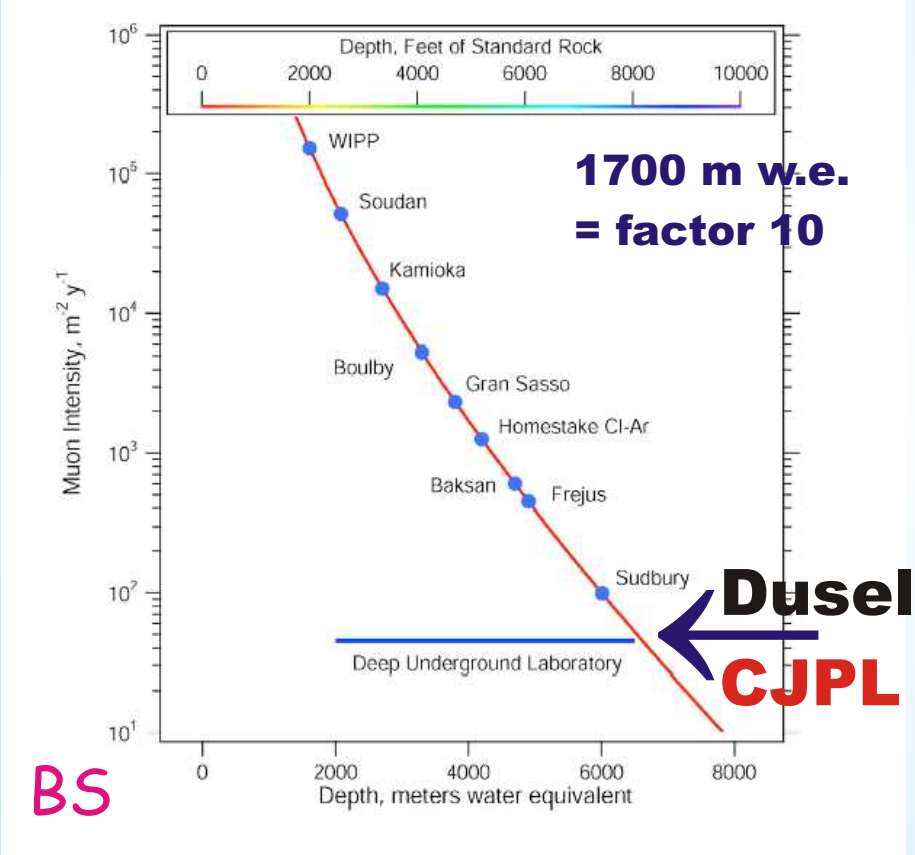
Bernhard Schwingenheuer

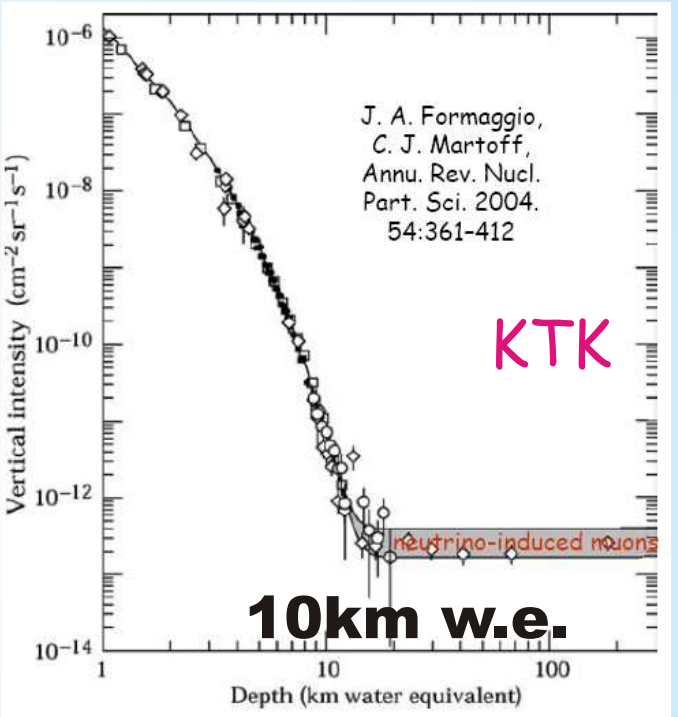
One lab fits all?

App. Ge det. in fund.l research B.Schwingenheuer 7

Spelunking

Muon flux versus depth

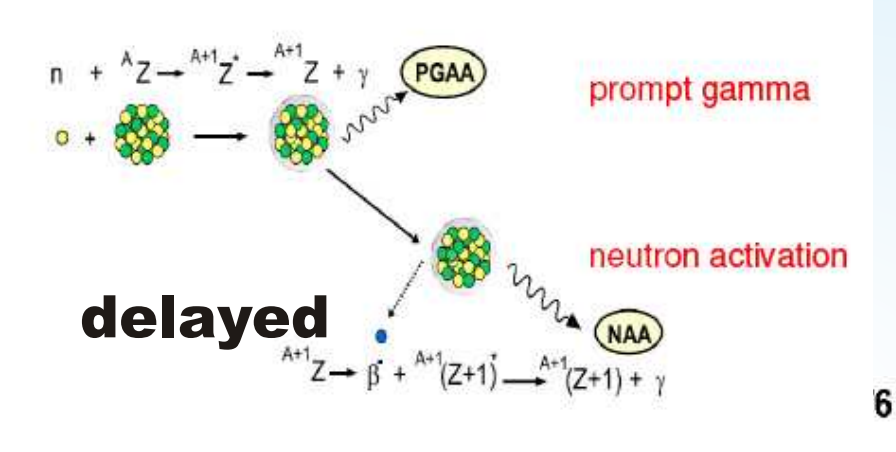




Allways some muons left. Schicksal...

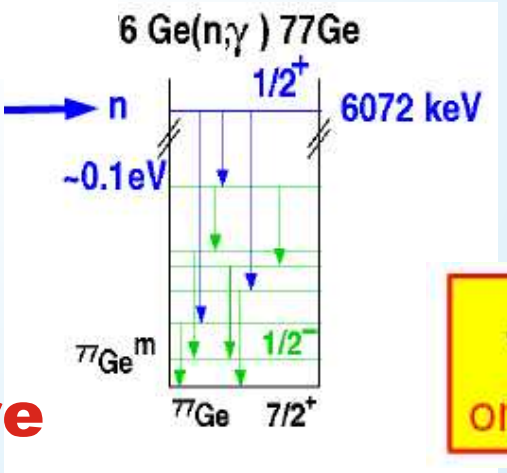
Neutrons are Nasty

Peter Grabmayr



Neutrons are produced by muons...

no shield works



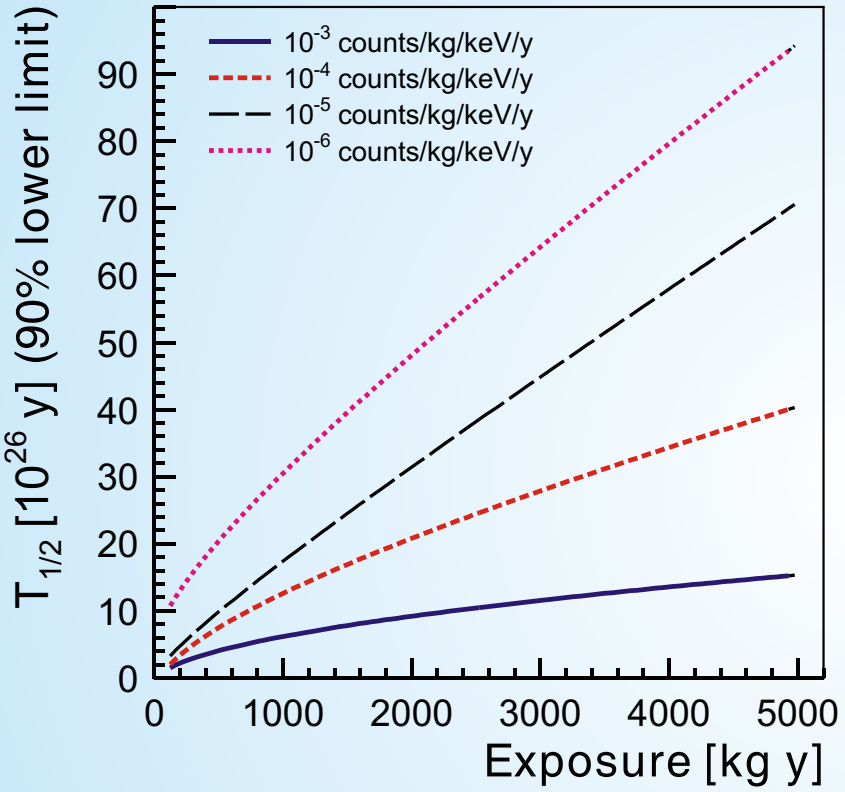
$$\nu = \frac{\sum E_i \sigma_i}{S_n \sigma_{tot}} = \frac{\sum E_i I_i}{S_n}$$

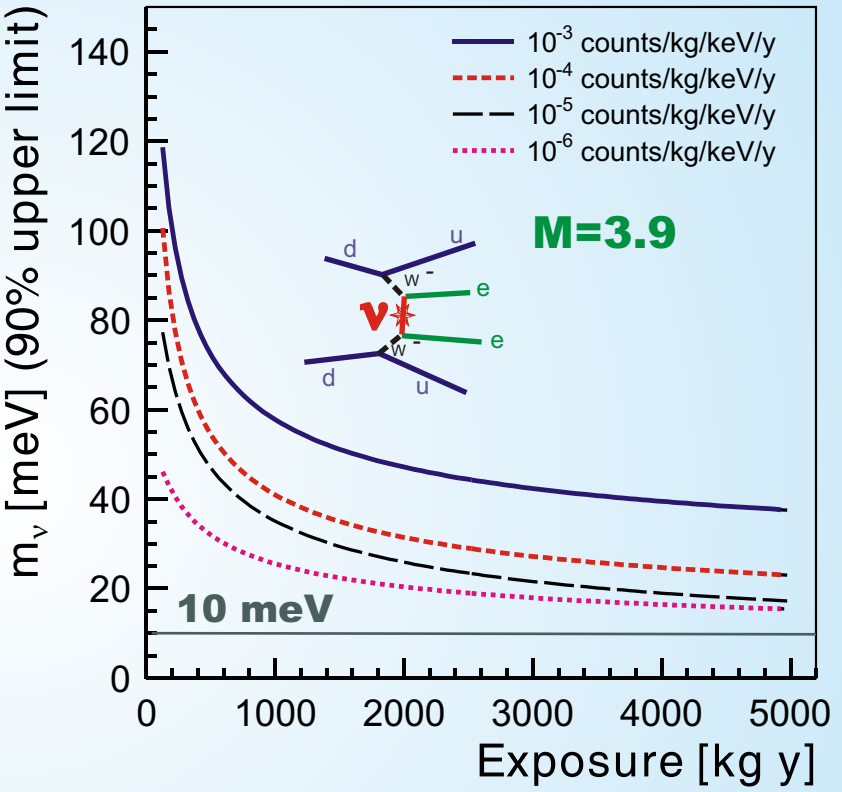
only 15% known

Vetos only partially help.

We need to know more

Background is Important

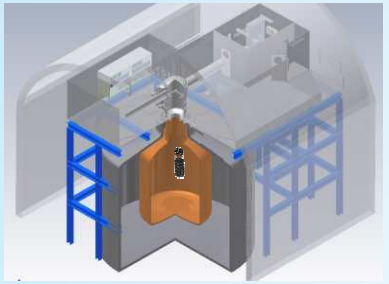




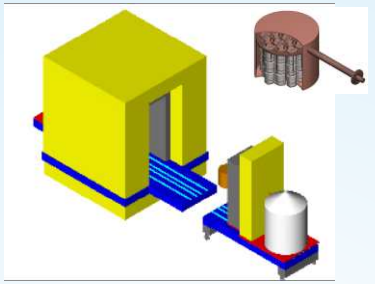
for any experiment with a low signal rate

Germanium or others, neutrino or dark matter

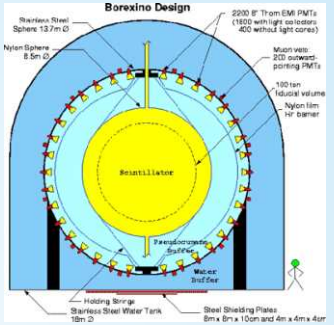
Shielding



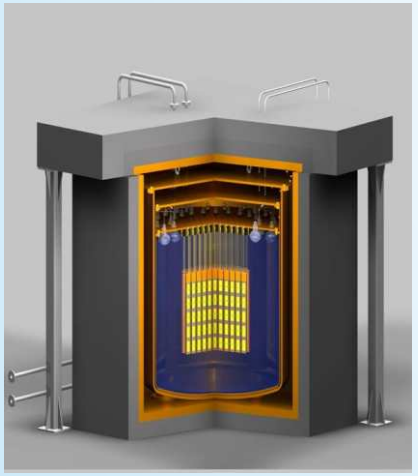
GERDA



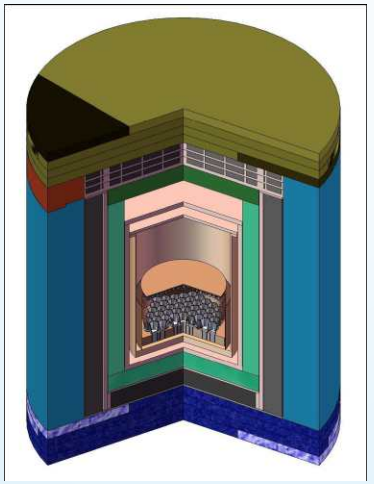
MAJORANA



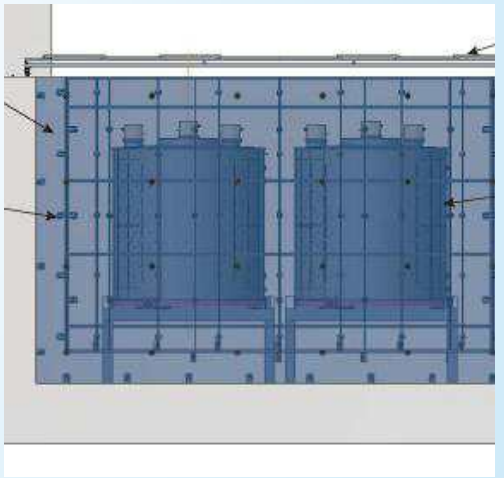
Borexino



CDEX TEXONO



PANDA X



Daya Bay

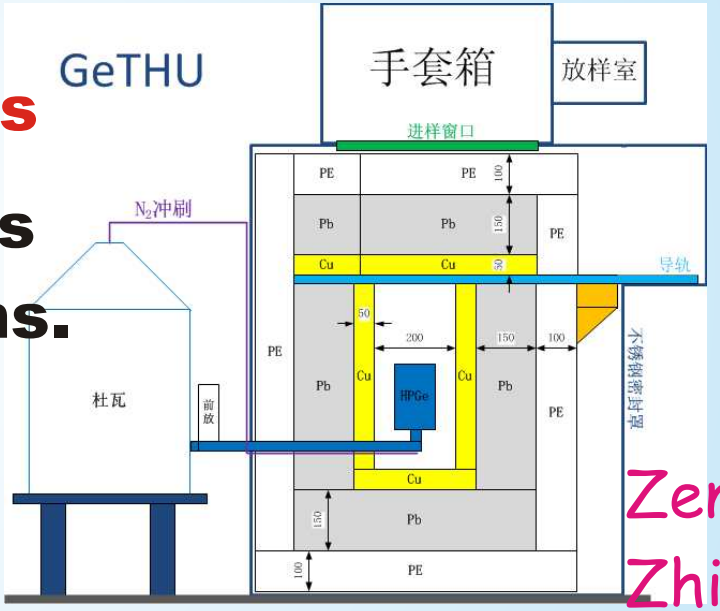
Shielding Materials

However you shield, the material needs to be clean.

→ **Screening facilities**

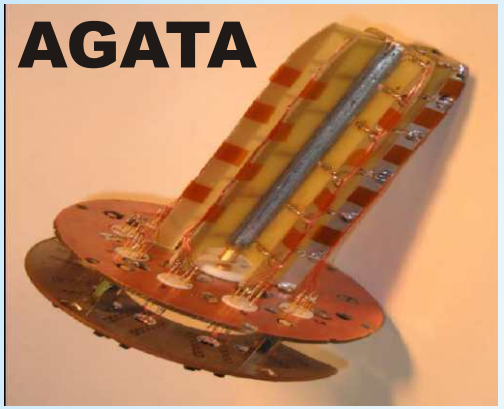
It should be low Z so it does form a goodtarget for muons.

Possibility for cooperation ?

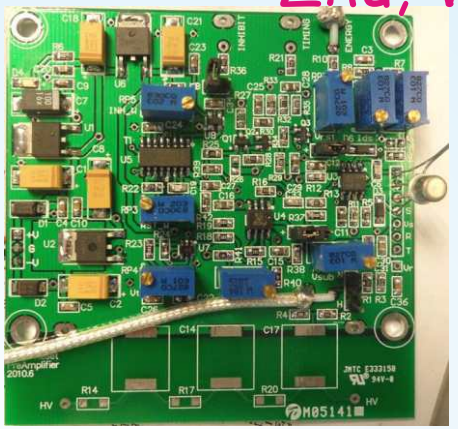


Material close to detector like holders, cables are even more critical.

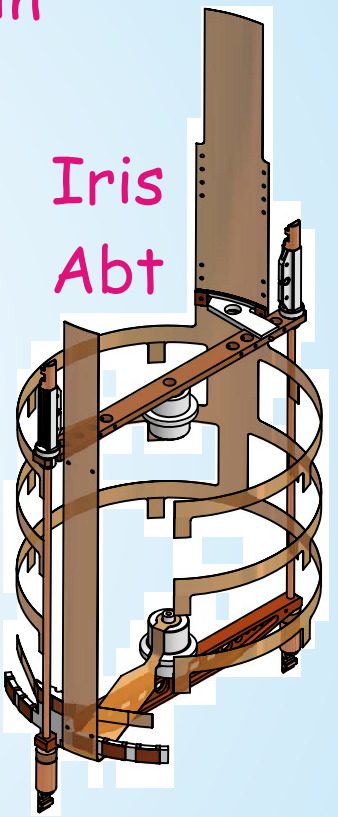
Electronics Developement



Zhu, Weibin

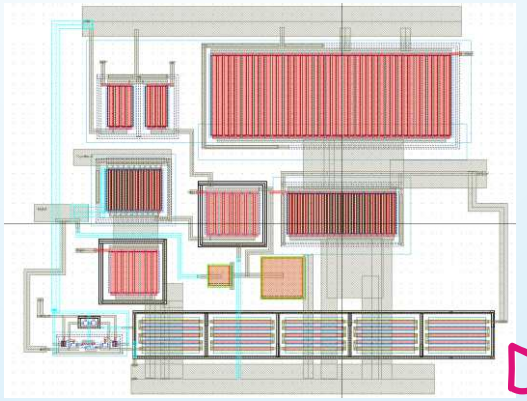


Iris Abt



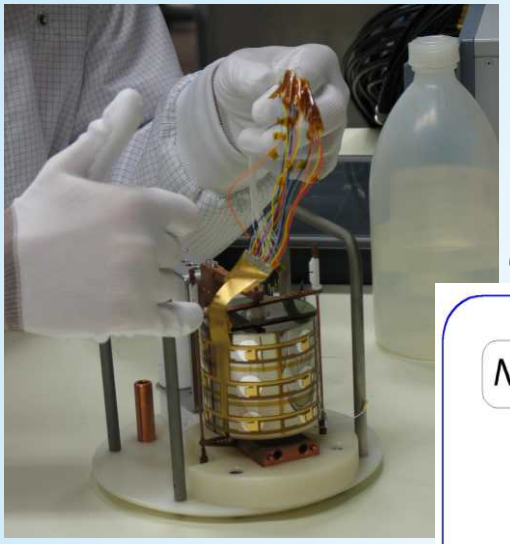
George Pascovici

Possibility for cooperation ?

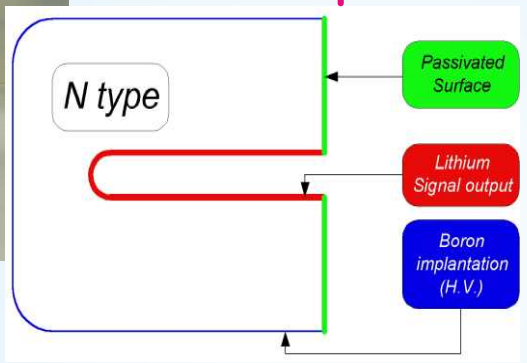


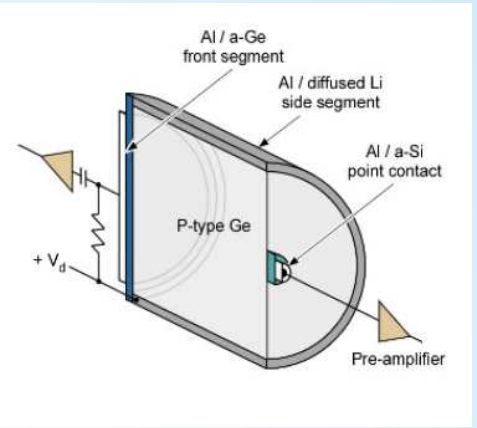
Deng,Zhi

Detector Developement

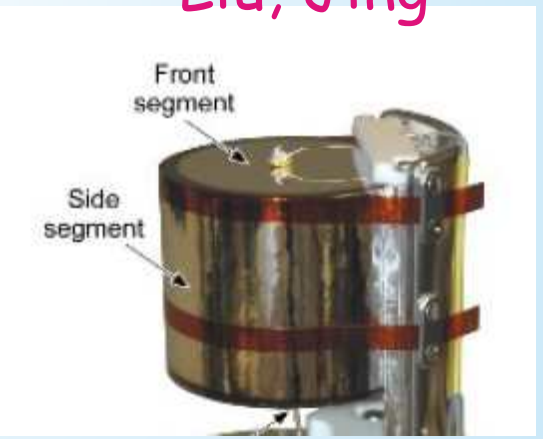


M.O.Lampert





Liu, Jing



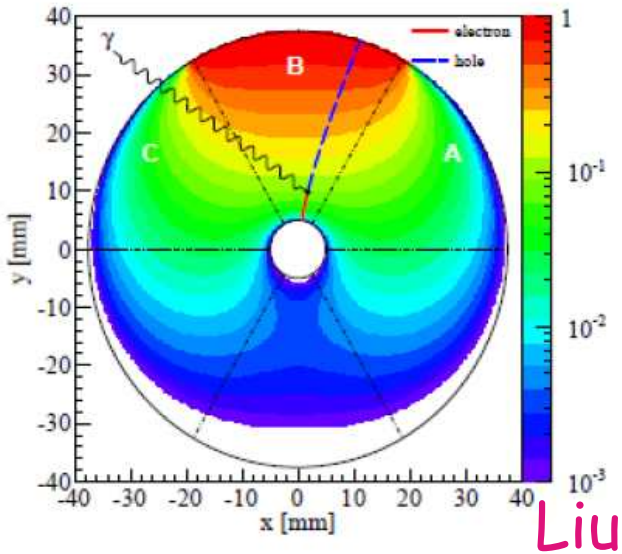
n-type
segmented
point-contact

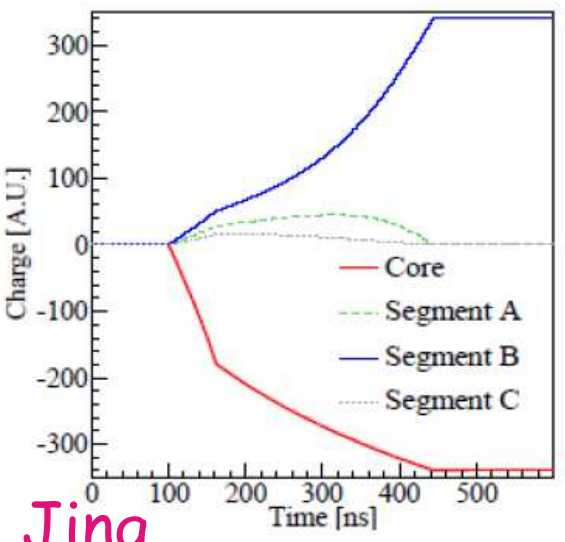
Li, Yulan

Possibility for cooperation ?

Software Tools

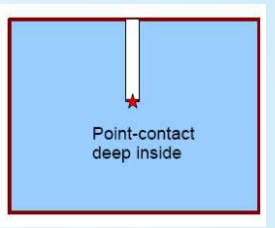
Simulation

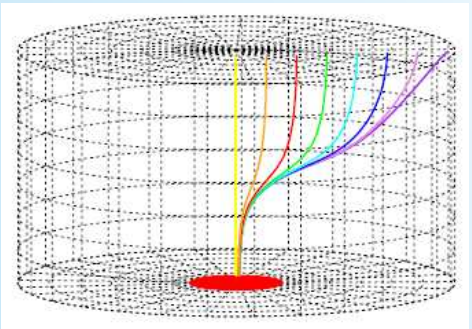




Liu, Jing

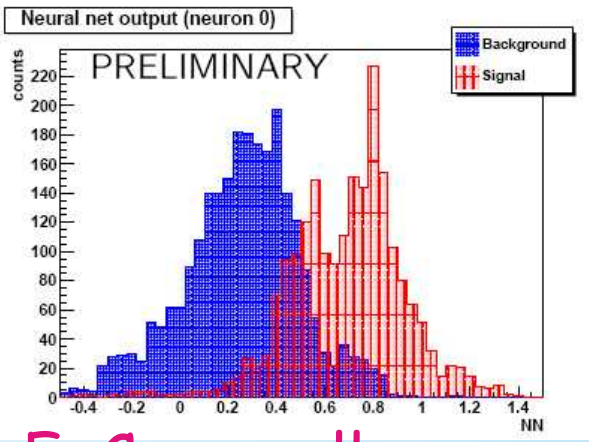
Detector design





Dusan Budjas

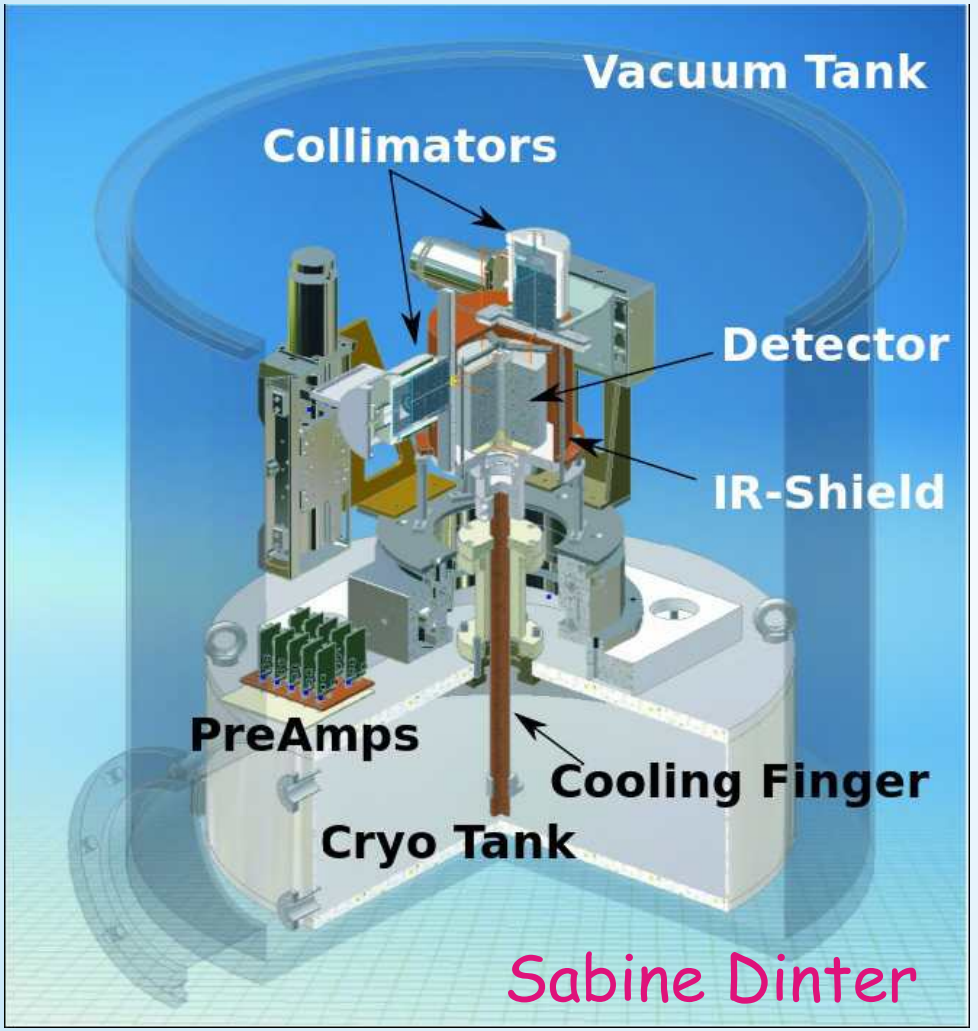
Analysis



F. Cossavella

Possibility for cooperation ?

Test Facilities



Possibility for cooperation ?

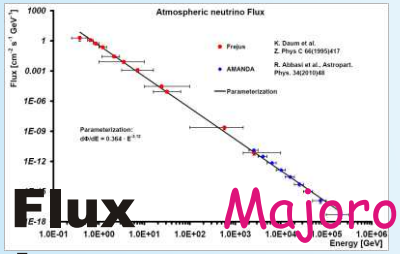
Does anybody want to visit?

Thinking

Not available commercially.

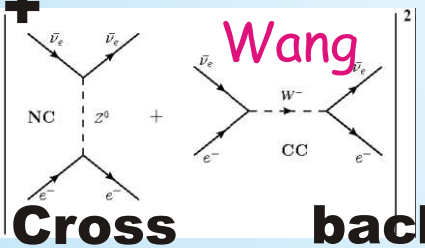
Need to optimize solutions for a given problem

We can still learn from each other.



Flux Majorovits

+



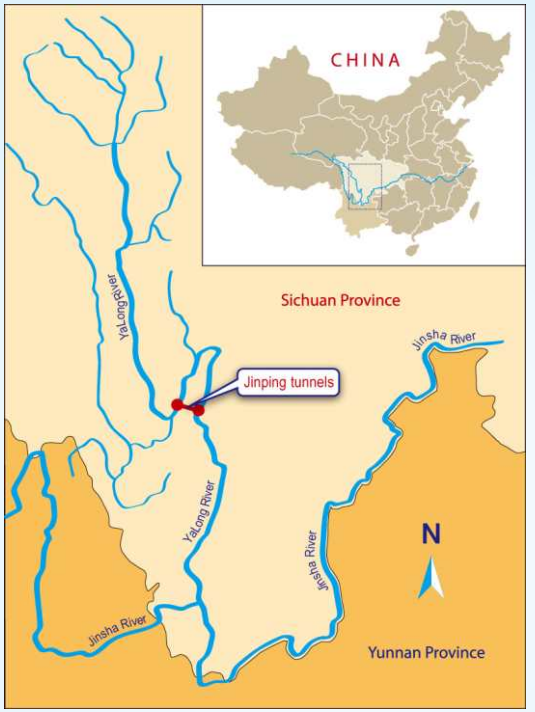
Wang

Cross section = backr. pred.

The Good 	Metallization:	Significant background if not taken care of. Can be controlled via HPGe screening of aluminum.
The Bad 	Surfaces: ^{68}Ge:	Need clean etchant. R&D for etchant screening! Depletion efficiencies have to be studied and improved!
The Ugly 	Atmospheric ν-induced muons Neutrinos	Irreducible after μ-veto and timing cuts. Needs investigation Irreducible after veto and timing cuts. Needs investigation

Outlook

I am looking forward to visiting Tsinghua Miyun factory and the CJPL.



And I hope that we will establish long lasting fruitful cooperation by defining small starter projects.

And that this creates friendship