The NuBall2 Project



Gabriel CHARLES

NuBall2 Scientific Workshop

20Ball 2



Outline of this fantastic presentation

Also called a journey through the pictures of my phone

The part to thank people

FACULTÉ DES SCIENCES

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The part to show pictures



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The part to show pictures

A part with experiments



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Outline of this fantastic presentation

Also called a journey through the pictures of my phone

The part to thank people

The part to show pictures

A part with experiments

Mainly showing nice pictures With nice equipment (sometimes) And nice people (sometimes) FACULTÉ

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- ALTO is <u>world leader</u> in construction, use and deployment of *hybrid* arrays. The nu-Ball2/PARIS configuration will be the most efficient hybrid array ever built
- These types of experimental campaign help give ALTO a high international visibility and attract visitors from all over Europe and the rest of the world (e.g. nu-Ball1 campaign 2017-2018: 150 scientists from 37 institutions in 16 different countries)
- Nu-Ball2 will bring together existing equipment from several partners:

γ-detectors (3 different hybrid geometries)

Clover Ge's (Gammapool EU consortium)

Co-axial Ge's

(UK/France loan pool)

PARIS phoswhich's (PARIS collaboration)

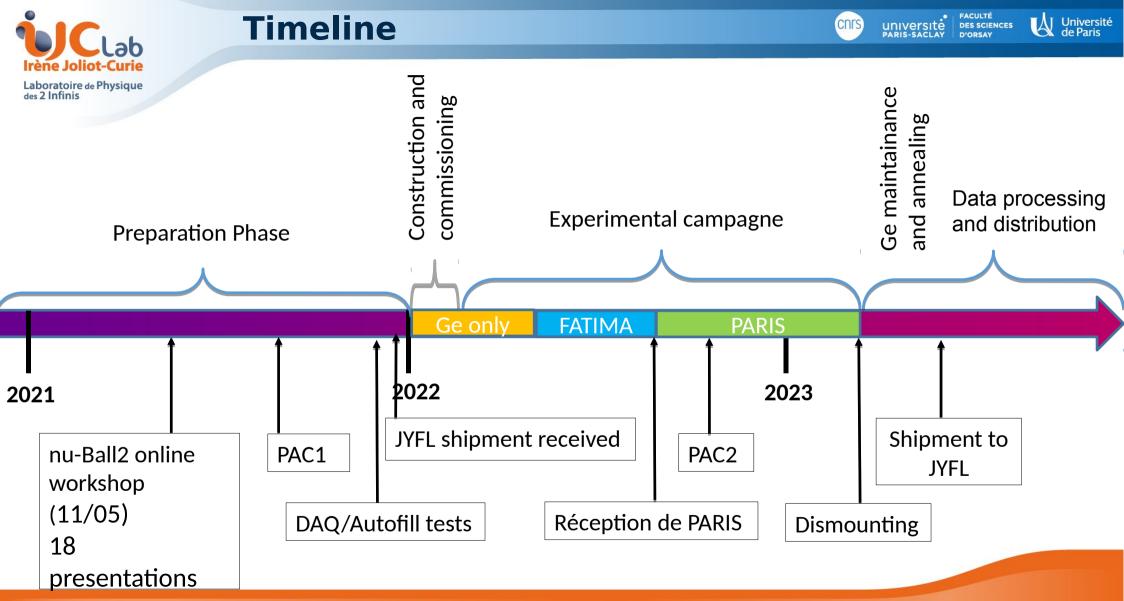
FATIMA LaBr3 (Surrey/Madrid) Coupled ancillary detectors

TFGIC DSSD (JRC-Geel (HIL Warsaw) EU commission) CORSET **OUPS/OPSA** (JINR Dubna) (IJC Lab)

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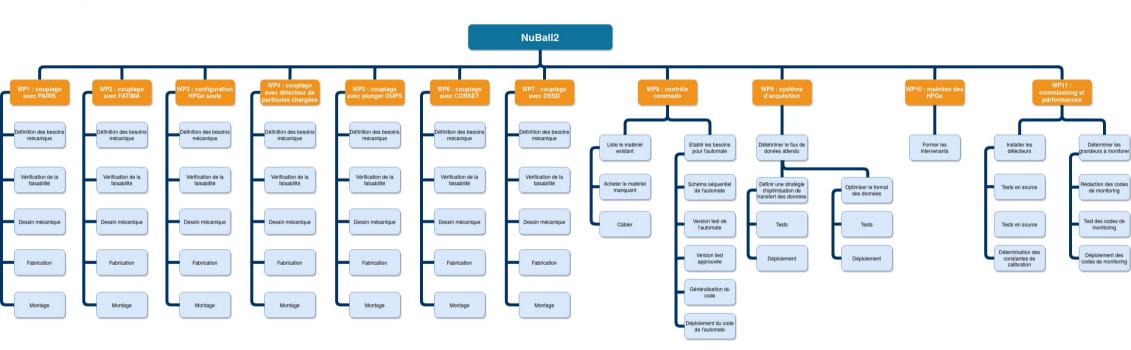


2024/07/03



Work Breakdown Structure

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Technical support

	2021	2022	2023
Bernard Mathon	0%	5%	0%
Miktat Imre	0%	5%	0%
Carlos Domingues-Goncalves	0%	5%	0%
Brice Geoffroy	0%	5%	0%
Thi Trung Nguyen	5%	10%	0%
Christine Le Galliard	30%	5%	5%
Gabriel Charles	20%	40%	20%
Nourredine Hammoudi	5%	20%	20%
Mariya Georgieva	5%	10%	10%
Tony Viaud	40%	5%	0%
Olivier Dalifard	40%	5%	0%
Jérémy Favre	0%	5%	5%
TOTAL (FTE)	1,45	1,20	0,60

+All the incredible team from ALTO: Hakim, Alain, Robert, Elie, Ahmed, Emmanuel, Fabien, Florent, Stéphane, Florian, André, Mario, Lucas

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+locals and non locals: Jonathan,
Matthieu, Christine, Waeli, Karl,
Georgi, Joa, Julien, Iolanda, David
Etasse, Corentin, Giorgia,
Desislava, Elisa, Nikola,
Konstantin + the students from
Oslo





sciences Université rsay de Paris

Where are the nice pictures?



Decembre 7th, 2021, shipment received from JYFL

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DD0 41

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Testing all the HPGe then mounting the structure and moving the detectors





Mounting and connecting the cable





....et des Origines

Cases for Life 902

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Login	Logout		AutoFill	
N1 EVHPGe1.01	760,58 PT_HPGe1.01(Q)	Bias SD1.01 PT_Cryst1.01(Q)	EVHPGe1.12	109, 15
EVHPGe1.02	760,58 PT_HPGe1.02(Q) 760,58 PT_HPGe1.02(Q) 760,58 PT_HPGe1.03(Q)	Bias SD1.02 PT_Cryst1.02(Ω)		109, 15
EVHPGe1.03 EVHPGe1.04		Bias SD1.03 PT_Cryst1.03(Ω) Bias SD1.04	EVHPGe1.14	108,45
EVHPGe1.05	760,58 PT_HPGe1.05(Q)	PT_Cryst1.04(Q)	EVHPGe1.16	109,62
EVHPGe1.06	108,18 PT_HPGe1.06(Ω)	Bias SD1.06 PT_Cryst1.06(Ω)	EVHPGe1.17	108,45
EVHPGe1.07	108,88 PT_HPGe1.07(Q) 39,10 108,92 PT_HPGe1.08(Q)	Bias SD1.07	EVHPGe1.18	108,30 I
EVHPGe1.09	42,59 108,69 PT_HPGe1.09(Ω)	PT_Cryst1.08(Ω) OBias SD1.09	EVHPGe1.20	108,73 P
EVHPGe1.10	760,58 PT_HPGe1.10(Ω)	PT_Cryst1.09(Ω) Bias SD1.10 PT_Cryst1.10(Ω)	EVHPGe1.21	108,34 P
EVHPGe1.11	110,86 PT_HPGe1.11(Ω)	Bias SD1.11 PT_Cryst1.11(Q)	EVHPGe1.22	109,39 P
Config	J.	Status HPGe	HPGe N1 HPGe N	2 0

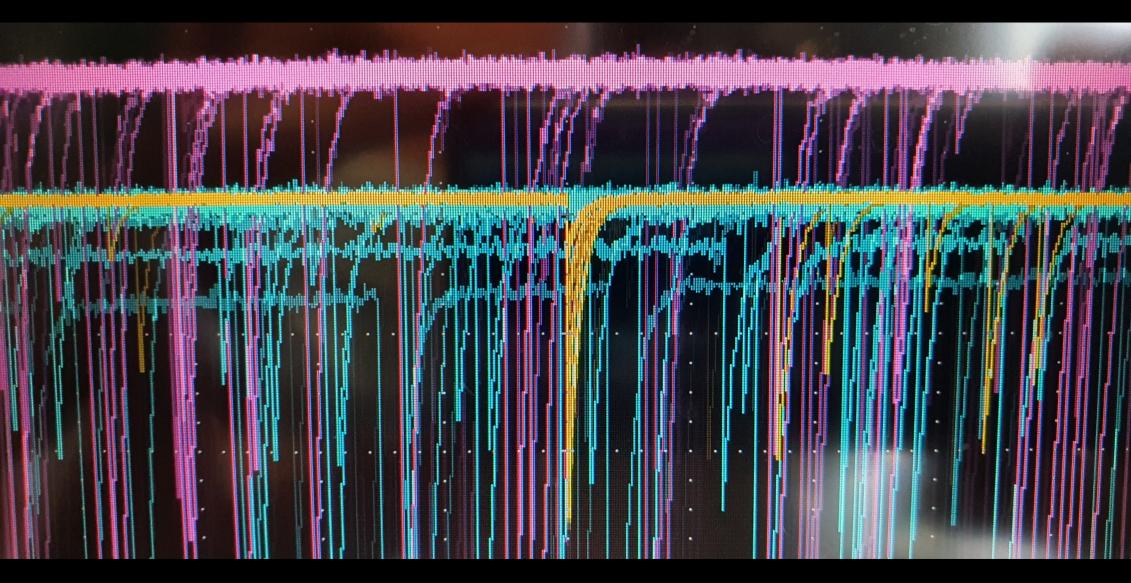
EVHPGe1.12	109, 15	PT_HPGe	e1.12(Q)	Bias SD	1.12
			29,18	PT_Cryst1.12(Q)	1.12
EVHPGe1.13	109,15	PT_HPGe	1.13(0)		
				Bias SD:	1.13
			29,09	PT_Cryst1.13(Q)	
EVHPGe1.14	108,45	PT_HPGe	1.14(Q)	Bias SD1	14
			34,33	PT_Cryst1.14(Q)	
EVHPGe1.15	109,00	PT_HPGe	1.15(Q)		
			28,20	Bias SD1 PT_Cryst1.15(Q)	.15
EVHPGe1.16	109,62	PT_HPGe1	L.16(Q)	Bias SD1.	.16
		D	110,04	PT_Cryst1.16(Ω)	
EVHPGe1.17	108,45	PT_HPGe1	.17(Q)	Bias SD1.	17
		D	35,50	PT_Cryst1.17(Q)	17
EVHPGe1.18	108,30	PT_HPGe1	.18(0)		
			30,07	Bias SD1.	18
				PT_Cryst1.18(Q)	
EVHPGe1.19	107,17 F	PT_HPGe1.	.19(Ω)	Bias SD1.1	9
		D	32,22	PT_Cryst1.19(Q)	
EVHPGe1.20	108,73 F	PT_HPGe1.	20(2)	Bias SD1.2	
			30,45	PT_Cryst1.20(Q)	0
EVHPGe1.21	108,34 P	T HPGe1.		- , . , , ,	
			. ,	Bias SD1.2 PT_Cryst1.21(Q)	1
				P1_Cryst1.21(Q)	
EVHPGe1.22	109,39 P	T_HPGe1.	22(Q)	Bias SD1.22	2
			29,60	PT_Cryst1.22(Q)	
			_		
e N1 HPGe N2	0	vclage		C	
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Updated all along the runs

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2022 February



Experiments and configuration

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Beam	Energy	Target	Configuration	Shifts Ran	Physics
$^{7}\mathrm{Li/neutrons}$	$17 \mathrm{MeV}/2 \mathrm{MeV}$	$^{238}\mathrm{U}$	FATIMA/LICORNE	42	Neutron-rich fission fragments spectroscopy
$^{18}\mathrm{O}$	$111 { m MeV}$	$^{197}\mathrm{Au}$	Ge only	19	Fusion-fission studies
$^{16}\mathrm{O}$	$95 { m MeV}$	64 Zn	PARIS	20	Shape and structure study
NaN	NaN	$^{252}\mathrm{Cf}$	PARIS	63	Neutron-gamma de-excitation
$^{28}\mathrm{Si}$	$143 { m MeV}$	40 Ca	OPSA/HPGe only	16	Shape evolution in $N = Z$ nuclei
^{24}Mg	$110 { m MeV}$	^{24}Mg	PARIS/DSSD	21	High spin structures
$^{2}\mathrm{H}$	$11 { m MeV}$	$^{235}\mathrm{U}$	PARIS/DSSD	21	Fission isomers in uranium
$^{58}\mathrm{Fe}$	$220 { m ~MeV}$	$^{208}\mathrm{Pb}$	PARIS/DSSD	10	Enhanced collectivity in 58 Fe
40 Ca	$160 { m MeV}$	$^{208}\mathrm{Pb}$	PARIS/DSSD	3	Super-deformed band in $\rm ^{40}Ca$
$^{12}\mathrm{C}$	$87.5 { m MeV}$	^{182}W	PARIS/DSSD	12	194,196 Hg fission studies
$^{2}\mathrm{H}$	$11 { m MeV}$	232 Th	PARIS/DSSD	15	Fission shape isomer in 232 Th
62 Ni	$220~{\rm MeV}$	$^{208}\mathrm{Pb}$	PARIS/DSSD	7	Coulomb excitation of 62 Ni