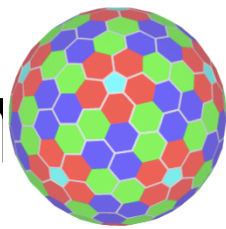


The AGATA Spectrometer

Next generation Gamma-ray
Spectroscopy

A precision instrument for
Nuclear Structure



The AGATA Collaboration

Steering Committee Chairperson: G deAngelis INFN-LNL

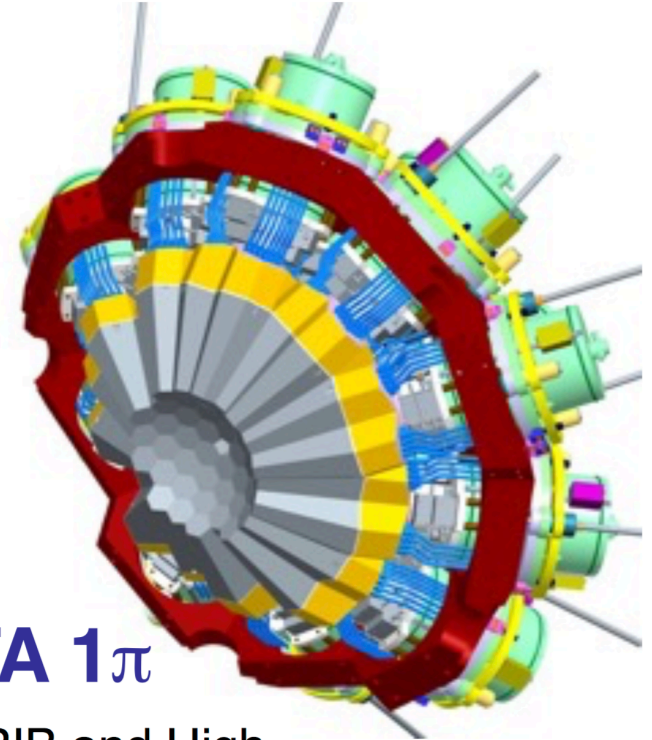


Bulgaria:	Univ. Sofia	13 Countries >40 Institutions
Denmark:	NBI Copenhagen	
Finland:	Univ. Jyväskylä	
France:	GANIL Caen, IPN Lyon, CSNSM Orsay, IPN Orsay, CEA–DSM–DAPNIA Saclay, IPHC Strasbourg, LPSC Grenoble	
Germany:	GSI Darmstadt, TU Darmstadt, Univ. zu Köln, TU München	
Hungary:	ATOMKI Debrecen	
Italy:	INFN–LNL, INFN and Univ. Padova, Milano, Firenze, Genova, Napoli	
Poland:	NINP and IFJ Krakow, SINS Swierk, HIL & IEP Warsaw	
Romania:	NIPNE & PU Bucharest	
Sweden:	Univ. Göteborg, Lund Univ., KTH Stockholm, Uppsala Univ.	
Turkey:	Univ. Ankara, Univ. Istanbul, Technical Univ. Istanbul	
UK:	Univ. Brighton, CLRC Daresbury, Univ. Edinburgh, Univ. Liverpool, Univ. Manchester, Univ. West of Scotland, Univ. Surrey, Univ. York	
Spain:	IFIC Valencia, IEM–CSIC Madrid, LRI Univ. Salamanca	

The AGATA Phase 1

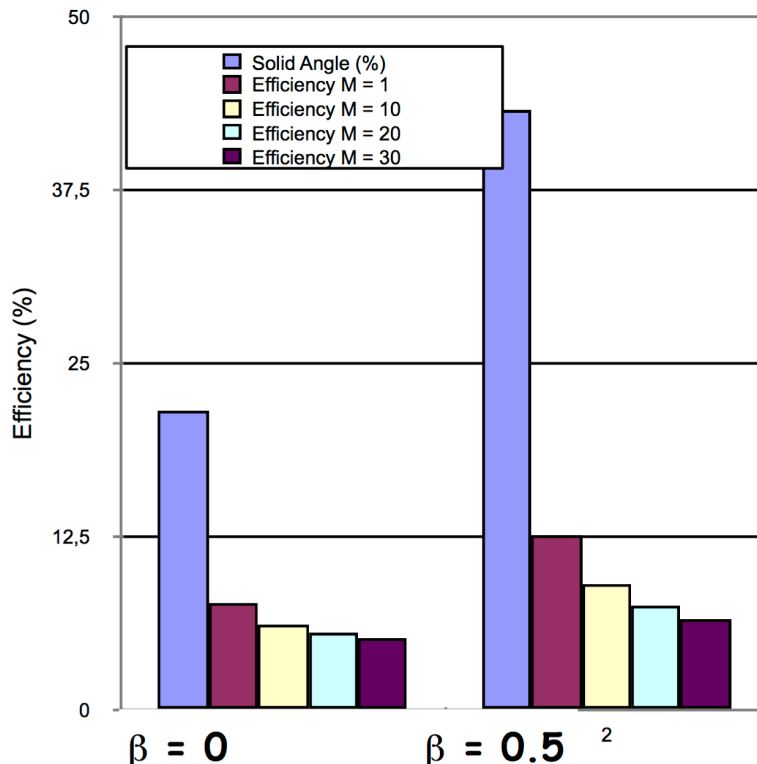
2009-(2015) 2020

- Phase 1 of AGATA ($>1\pi$) \rightarrow 60 crystals
- **MoU ongoing, only 70% achieved, decided prolongation till 2020**
- Triple and Double clusters
- The first “real” tracking array



AGATA 1π

To be used at RIB and High Intensity Stable beam facilities (**FAIR-HISPEC, SPIRAL2, SPES, GSI, LNL, GANIL, ...**)
 Coupled to spectrometers, trackers neutron and LCP arrays...



AGATA's Deployment

Intense stable beams
ISOL

2009–11 → INFN LNL
15 detectors

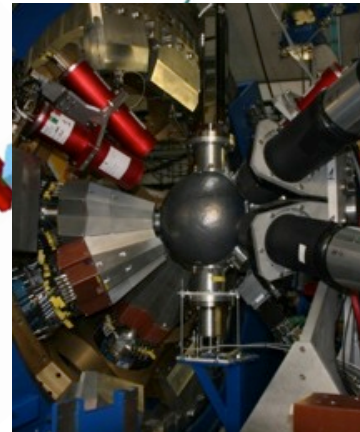
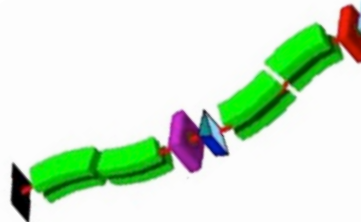


AGATA D.+PRISMA

Total Eff_{Nominal} ~ 2.6%

Fast Fragmentation beams

2012 2014 → GSI
21 detectors

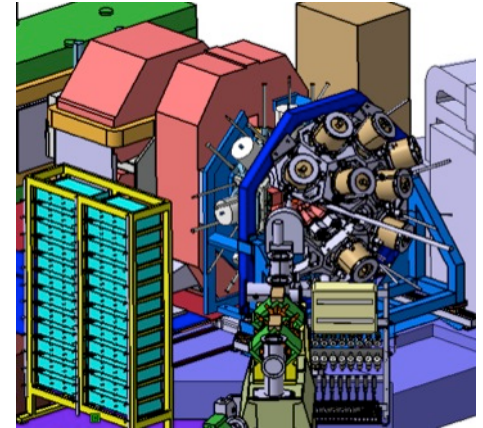


AGATA @ FRS

Total Eff. ($\beta=0.5$) ~ 10%

Stable beams,

2014– 19 → GANIL/SPIRAL
30–45 detectors



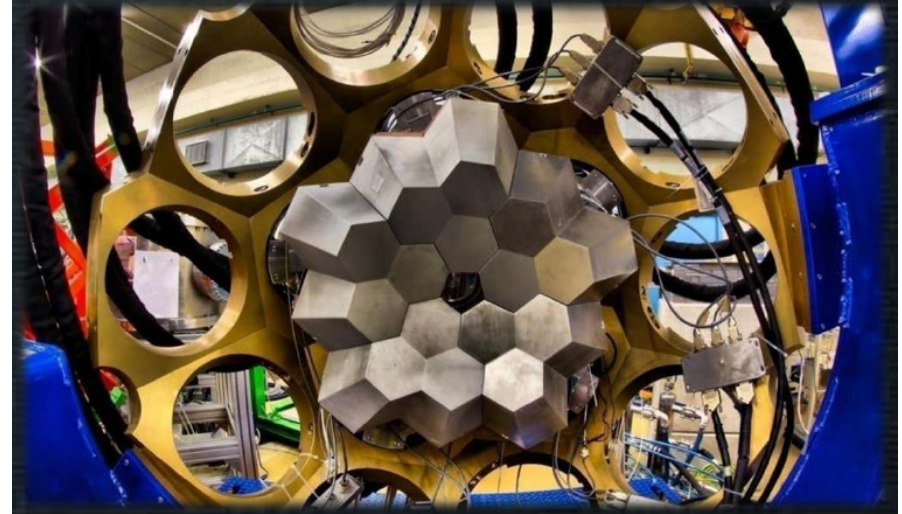
AGATA @GANIL

Total Eff ~ 8% to 14%

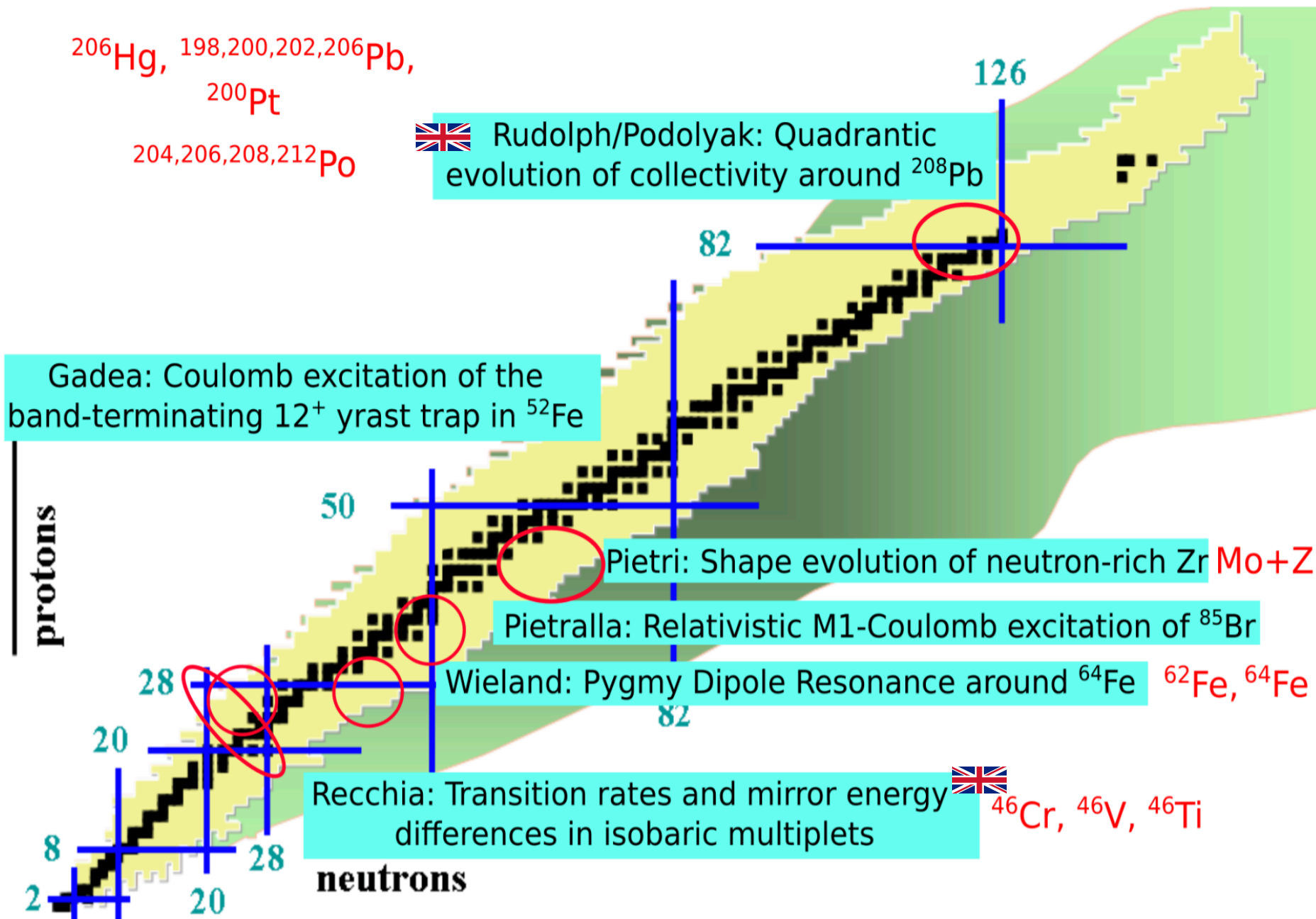
LNL results, publications emerging

19 (+3) exp.
2009– 2011

- J. Litzinger et al, Phys. Rev. C92 115, 064322 (2016)
S. Ceruti et al, Phys. Rev. Lett. 115, 222502 (2015)
F. C. L. Crespi et al Phys. Rev. C 91, 024323 (2015)
A. Vogt, et al Phys. Rev. C 92, 024619 (2015)
P. G. Bizzeti et al Eur.Phys.J. A 51, 49 (2015)
B. Birkenbach et al. Phys.Rev. C 92, 044319 (2015)
E. Sahin, et al Phys. Rev. C 91, 034302 (2015)
P.R. John, et al Phys. Rev. C 90, 021301(R) (2014)
L. Pellegriet al Phys. Lett. B 738 (2014) 519
F.C.L. Crespi et al Phys. Rev. Lett. 113, 012501 (2014)
V. Modamio et al, Phys. Rev. C 88, 044326 (2013)
V. Vandone et al, Phys. Rev. C88, 034312 (2013)
C. Louchart, et al, Phys. Rev. C 87, 054302 (2013)
P.-A. Soderstrom, et al, Phys. Rev.C 86, 054320 (2012)



The GSI Campaign 2012-2014 (7 experiments)





The GANIL Campaign organization 2014-2019 (>26 expts)

The AGATA campaign at GANIL has been extend to end of 2019

Each GANIL PAC has a "PrePac" workshop with a specific call : *AGATA Collaboration Meeting*

- 1st PAC in 2014 : VAMOS (10 experiments approved)
- 2nd PAC in 2015 : VAMOS || NEDA (10 experiments approved)
- 3rd PAC in 2016 : NEDA || FATIMA (6 experiments approved)

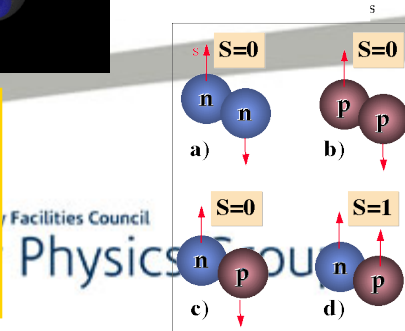
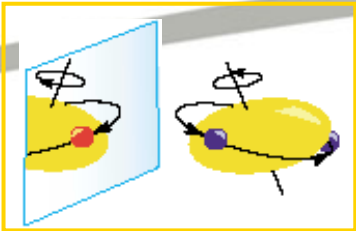
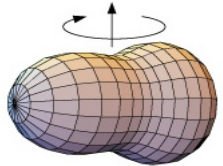
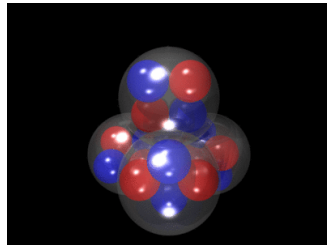
E724	M.A. Bentley		20	1	1	18		B
E725	B. Cederwall		36	1	1	30	4	A
E727	B. Fornal		22	2	3	15	2	A
E730	J.J. Valiente-Dobon E. Clément		32	1	1	30		A
E731	A. Boso		20	1	1	18		A
E735	M. Palacz		23	1	1	21		B

4th PAC late 2017 : to be defined between MUGAST and/or VAMOS GFM

Experiments to be run in 2019 ...

- γ decay from near-threshold states in ^{14}C
- Prompt γ /proton spectroscopy in ^{65}As .
- Isospin Symmetry Breaking in the A=63,71 mirror nuclei
- Search for isoscalar pairing in the N=Z nucleus ^{88}Ru
- Purity of the $g_{9/2}$ configuration in ^{94}Pd
- Studies of excited states in $^{102,103}\text{Sn}$
- Octupole shape in ^{112}Xe

NEDA



AGATA's **Future** Deployment

N-rich ISOL beams

2021-14 → SPES LNL
>45 detectors



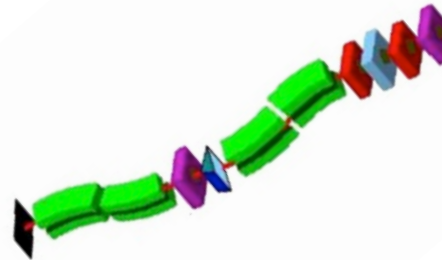
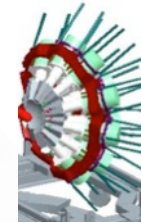
SPES Project



INFN
Istituto Nazionale
di Fisica Nucleare
Laboratori Nazionali di Legnaro

Fast Fragmentation beams

2025 → NUSTAR/FAIR
→ 60 detectors

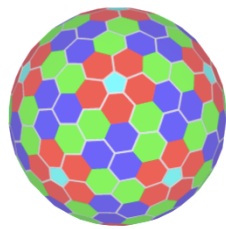


The present AGATA MoU end 31st December 2015
Presently being extended to 31st December 2020
Realisation of 60 detectors and operational costs

STFC L&C, Graeme Blair (JW) **SIGNED**



Potential UK AGATA Project



- AGATA Physics meeting in May 2016: Significant interest & involvement in UK in AGATA physics
- **Successful AGATA Project submission in 2007, but latest project submission not successful**
- AGATA still has major UK involvement, and is a significant project on the European stage.
- **Part of NPAP Roadmap and is a prominent feature in NuPECC LRP**

Bid as part of current MoU towards 60 detectors

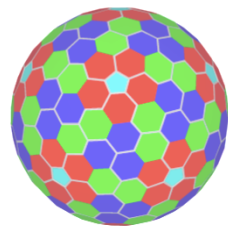
Physics Focus:

SPES ~ 2021–2024

FAIR ~ 2025

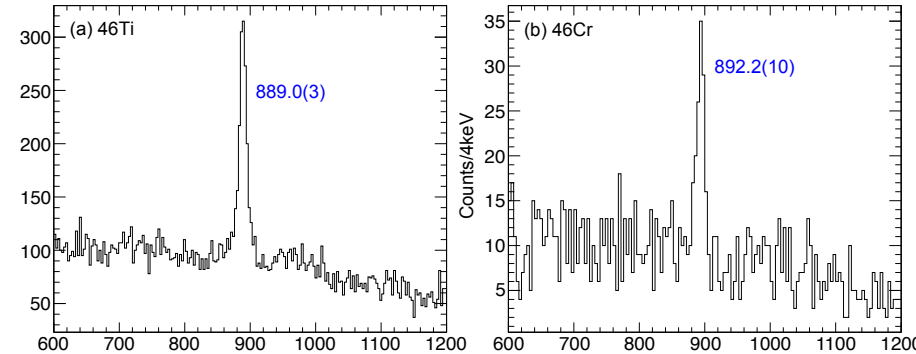


Potential UK AGATA Project

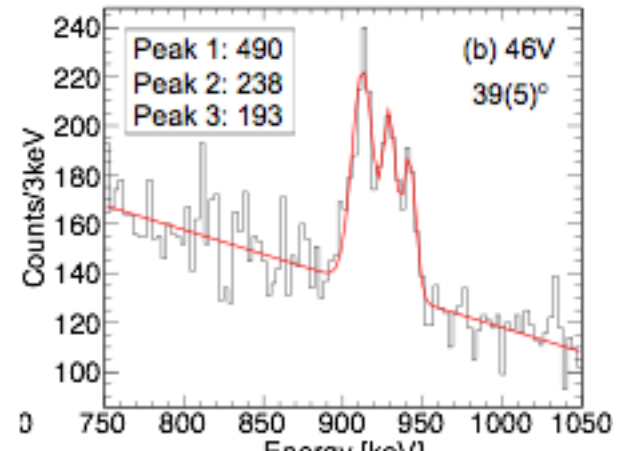


- Aiming towards a 60-detector system for HISPEC
- Builds on UK investment in NuSTAR
- **Position-sensitivity of array is significant step forward at high v/c**

Resolution close to 1% at $\beta \sim 0.5$

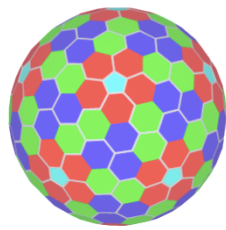


...enables precision spectroscopy...





Potential UK AGATA Project



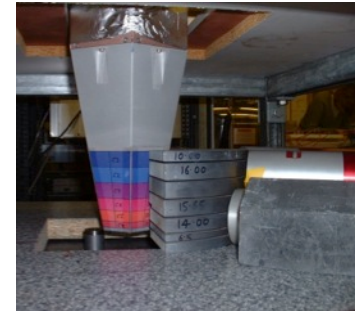
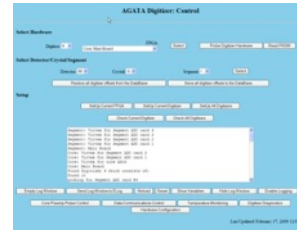
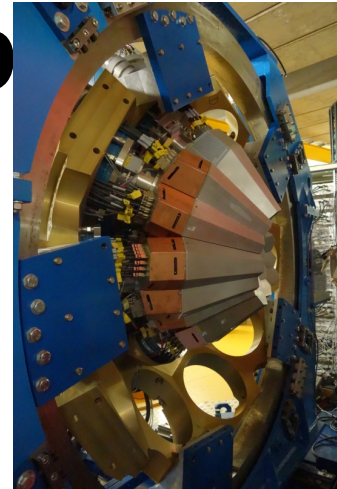
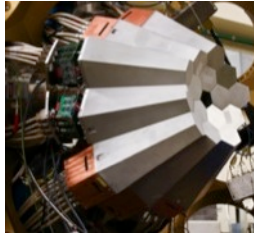
Potential bid: 1–2 triple clusters + associated development/manpower.

SOME ISSUES TO CONSIDER

- AGATA has had a difficult time in STFC – needs to be clear why this bid is important now
- **Step-change in performance needs to be clear**
- Need to show UK leading science for significant part (15–20%) of AGATA physics programme
- **Science lead both at SPES and FAIR**

AGATA UK Leadership

- Mechanics
- EDAQ
- Detector characterisation,
PSA
- Management
- Simulations



AGATA UK Leadership

Chairperson of ASC	Paul Nolan
Project Manager, Chairperson AMB	John Simpson
Chairperson of ACC, spokesperson	John Simpson
Campaign Spokesperson for Legnaro	Sean Freeman
Campaign Spokesperson for PRESPEC/GSI	Mike Bentley
Chairperson ISC for PRESPEC @GSI/FAIR	Paddy Regan
<u>UK chair of all key international committees</u>	

ASC members	Paul Nolan, John Simpson.
AMB, Data Analysis	Andy Boston
Detector Acceptance	Helen Boston
Physics and expt. simulations	Marc Labiche
PSA Algorithm development	Laura Harkness–Brennan
Mechanical Infrastructure	Alan Grant
Data processing	Ian Lazarus
PAC membership	