High resolution $\gamma$-spectroscopy employing exotic beams with AGATA (Advanced GAmmma Tracking Array)

AGATA today's arrays

- Efficiency: ($M_\gamma = 1$) 43% 10%
- Efficiency: ($M_\gamma = 30$) 28% 5%
- Peak Total: ($M_\gamma = 1$) 58% 55%
- Peak Total: ($M_\gamma = 30$) 49% 40%
- Angular Resolution $\sim$ 1 FWHM (1 MeV, $v_c = 50%$) 6 keV 40 keV
- Rates ($M_\gamma = 1$) 3 MHz 1 MHz
- Rates ($M_\gamma = 30$) 300 kHz 20 kHz

AGATA-cryostat:
- Crystals operated at LN2 temperature and high vacuum
- Connection between warm and cold preamplifier
- Reliable signal transmission

Electronics:
- 111 FETs serve first amplification stage
- High precision pulser on core preamp

The C/V - transducer
- Sensitive to $\Delta C$ by using reference capacity
- DC voltage signal: $\Delta V = 50%$

LN2 level for different inclination
- AGATA dewar as cylindrical capacitor
- Capacity as function of LN2 level
- Direct read out of LN2 level
- Information about LN2 consumption
- $\Delta C = 130 \text{pF} \sim 12%$

A novel LN2 fill level meter

- Sensitive to $\Delta C$
- AGATA dewar as cylindrical capacitor
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AGATA @ Legnaro (Italy)

4 ATCs fully operational in demonstrator with PRISMA + DANTE

Mean values of FWHM (Segments):
- $E_\gamma = 60 \text{keV}$ FWHM = 965 eV
- $E_\gamma = 1.3 \text{MeV}$ FWHM = 1.94 keV

- 180 irregular shaped, 36 fold segmented HPGe-crystals
- 3 different crystal shapes
- hermetically sealed in aluminium can

$E_\gamma$ FWHM Core [keV] FWHM Segments [keV]
- 60 keV $\leq 1.35 \leq 1.30$
- 1.3 MeV $\leq 2.35 \leq 2.30$

- 17th Euroschool on exotic beams, Santiago de Compostela, Spain

[1] D. Bazzaco et al., AGATA technical proposal