The AGATA Demonstrator at LNL: Complementary detectors for the next commissioning experiments
A. Gadea (CSIC-IFIC / INFN-LNL) on behalf of the AGATA Collaboration
**Commissioning Preliminary Plan**

<table>
<thead>
<tr>
<th>Task</th>
<th>2008 1er trimestre</th>
<th>2° trimestre</th>
<th>3er trimestre</th>
<th>4° trimestre</th>
<th>2009 1er trimestre</th>
<th>2° trimestre</th>
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<td>feb</td>
<td>mar</td>
<td>abr</td>
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<td>CLARA at LNL</td>
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<td>AD in-beam commissioning</td>
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<td>In-beam test no-Ancillary</td>
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<td>In-beam test simple Ancillary</td>
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<td>In-beam test PRISMA</td>
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<td>AD + PRISMA Experiments</td>
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The earliest possibility to run in-beam tests is Dec. 2008 - Early 2009

- **Phase 0**: commissioning with radioactive sources starting when detectors and electronics are available (even partially).
- **Phase 1**: easy test with tandem beams with no ancillary detectors. Radiative capture or fusion-evaporation reactions with light targets in inverse kinematics.
- **Phase 2**: test with a “simple” ancillary detector with limited number of parameters (DANTE). Coulomb excitation reactions with medium mass beams (A<100) in inverse kinematics.
- **Phase 3**: test with PRISMA with multi-nucleon transfer reactions and at high multiplicity with appropriate ancillaries.
Low Energy reaction mechanisms used for γ-Spectroscopy

- Coulomb excitation and Inelastic scattering.
- Transfer and quasi-elastic processes ($p,n$ capture...).
- Multi-nucleon transfer.
- Deep Inelastic Collisions.
- Quasi-fusion reactions.
- Fusion with light particles evaporation.
- Fusion with evaporation of Massive Fragments (IMF).
- Radiative capture and fusion.
- Fusion-fission.

Smaller impact parameter “b”
Program for the in-beam commissioning until summer

• May 2009: probably few days of “any beam available”
  → Probably again fusion-evaporation with light target
• June 2009: short run (~4 days) probably with “simple” ancillary detectors → Coulex or direct reactions.
• July 2009: short run (~4 days) probably with “simple” ancillary detectors → Coulex or direct reactions.

Meaning of “simple” ancillary detectors:
  • Strongly depends on the “complexity” we will be able to manage with the GTS and the available ancillary DAQ.
  • In any case a limited complexity of ancillaries with reduced setting time and possibility of on-line analysis.
AGATA and Other Detectors

- Digitizer
- Pre-processing
- PSA
- Event Builder
- Ancillary Merge
- Tracking
- Online analysis
- Storage

- GTS local
- GTS supervisor
- AGAVA
- FJ-PAN
- Other VME
- Other
- Readout
- Analogue Other

Prompt trigger
## Complementary detectors Front-End DAQ & readout

### PRISMA Front-End (Nicola Toniolo INFN-LNL)

<table>
<thead>
<tr>
<th>CPU</th>
<th>Wiener link</th>
<th>AGAVA</th>
<th>ADC, TDC</th>
<th>VME crate</th>
</tr>
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</table>

- Based on XDAQ
- Linux software
- Wiener VME link
- FPGA inside

- V785 Peak sensing ADC (32 Channels)
- V775 TDC common START/STOP (32 Channels)
- V830 Scaler (32 channels)

### HELENA Front-End (Sergio Brambilla INFN-Milano)

<table>
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<tr>
<th>STRUCK</th>
<th>DSP &amp; link</th>
<th>AGAVA</th>
<th>ADC, TDC</th>
<th>VME crate</th>
</tr>
</thead>
</table>

- Based on KMAX
- Windows software
- Struck optical link with DSP & Memory

- V785 ADC
- V775 TDC
- Scalers and other standard VME modules
AGAVA VME card

IFJ-PAN, Kraków & INFN-Milano

- VME backplane connector
- FPGA VIRTEX 2
- GTS transceiver
- Ethernet
- Optolink to GTS
Possible Trigger / DAQ modes:

Only trigger:
Possibility to use GTS + AGAVA to send a trigger tag to AGATA, ancillary trigger without ancillary detector data and DAQ ? i.e. is possible to open an acquisition gate with GTS + AGAVA?

Only acquisition:
Whenever an ancillary trigger present: acquisition of time stamped ancillary data in parallel with the AGATA data with off-line (or on-line if possible) merging and analysis.

Full:
Ancillary devices participated in trigger and are acquired only with successful trigger. Merging and on-line analysis by Narval + user libraries.

To be explored with GTS group
The first subset of AGATA (the Demonstrator Array) will start operation during 2009 at the Laboratori Nazionali di Legnaro. Installation and commissioning are in progress.
The DANTE heavy ion position sensitive detectors

J.J. Valiente-Dobon
INFN-LNL

MCP

Delay line

Preamplifier in vacuum

Side view

Thickness: 13mm
DANTE support design and construction

INFN-Milano and INFN-LNL
Possible Direct Reactions setup

EXPANSION CHAMBER with general purpose multipin connector feedthroughs

Si-DSSD CD-detector (Cologne, Munich, Saclay, ...