**1)     Title and spokesperson**

Order-to-chaos transition in warm rotating 174W nuclei.

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**2)     Main objectives**

Study of the transition between order and chaos in the nucleus 174W by gamma-spectroscopy, focusing on the conservation of selection rules of the *K* quantum number with temperature.

**3)     Short statement on the run itself and how AGATA operated**

The 174W nucleus was populated by the fusion-evaporation reaction of 50Ti (at 217 MeV) on a 128Te backed target. The experiment was performed in July 2010, using 4 AGATA triple cluster coupled to the Helena array (27 BaF2 scintillators). There were no significant problems during the experiment related to the AGATA detectors. No significant gain fluctuations of the AGATA detectors were observed. The beam was very stable and the current was limited to 1pnA in order to prevent target damage. The trigger conditions were either four-fold events in AGATA or three-fold events in AGATA in coincidence with at least one event in Helena. The acquisition system was running rather smoothly a part from seldom recoverable interruptions.

**4)     Status of the analysis**

After a presorting stage of approximately 4 months (replay of all data-set for calibration, PSA and tracking), we have started to extract physical information. In particular, we are able to build gamma-gamma matrices in prompt or delayed coincidence with the scintillators.

**5)     Any results**

We have used the Helena array as a multiplicity filter to enhance the selectivity to the 174W nucleus and to focus on the high-multiplicity and high-energy part of the gamma-cascades (where the transition into the chaotic regime is expected to take place).

Since the population of high-*K* bands is rather weak, the selectivity to high-*K* cascades has been enhanced through their long lived isomeric decays. In particular, gamma-gamma matrices built on prompt and delayed transitions measured in the Helena array have been constructed and analyzed in terms of ridge-valley structures.

A quantitative study of the ridge structure of both matrices is now in progress by a statistical fluctuation analysis. This is going to provide the total number of bands of 174W and the number of bands of high-*K* nature as a function of excitation energy. Future studies, based on statistical correlations techniques, will help focusing on region of the order-to-chaos transition.

Cranked shell model at finite temperature are now in progress in order to interpret the data.

**6)     Publications or talks (or an indication if there will be any)**

**Publications:**

* V. Vandone et al., "Order-to-chaos transition in warm rotating 174W nuclei" - Varenna proceeding 2010, in print.
* V. Vandone et al.,, "Study of the order-to-chaos transition in 174W using the AGATA Demonstrator" - LNL Annual Report 2010, page 15.
* V. Vandone et al., "Study of the order-to-chaos transition in 174W using the AGATA Demonstrator" - Journal of Physics, Conference series, in print.

**Talks:**

* V. Vandone - AGATA Physics Workshop 2010, 4-7 May 2010, Istanbul (Turkey)
* S. Leoni - 10th AGATA week Lyon 2010, 22-26 November2010, Lyon (France)
* V. Vandone - EGAN 2011 Workshop, 26-30 June 2011, Padova (Italy)
* V. Vandone - XIX International School on Nuclear Physics, Neutron Physics and Applications, 19 - 25 September 2011, Varna (Bulgaria)

**7)     Any problems**

All technical problems related to the replay and presorting of the data have been solved through the help of local LNL team. The procedure is now rather well established.

**8)     Anything else**

Nothing else to report.