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## GET: a Generic Electronic system for TPCs for nuclear physics experiments<sup>o</sup>

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In experiments with radioactive beams from heavy ions facilities it is shown that active targets and TPCs experimental methods are versatile and effective means to study nuclear spectroscopy (ref. 1). The principle advantages are good resolution, versatility and high luminosity for the detection for low energy recoils. To address the needs of the nuclear physics community (ACTAR (GANIL), AT-TPC (NSCL) , SAMURAI-TPC (RIKEN), MINOS (IRFU)), we are in the process of developing a financed (ANR, NSF) Generic Electronic system for TPCs (GET) to cover small to medium sized instrumentation (64 to 32k channels).

GET specifications cover a relatively wide charge dynamic ranges and 4 level numeric trigger for pulse shape recording with event rate of up to 1 kHz. The system architecture includes frontend boards, AsAd, housing, four 64-channel ASICs, AGET and ADCs together with built-in power supply monitoring, calibration, synchronization and inspection features controlled by an FPGA.

Each AGET channel includes a test pulser input, a charge sensitive preamplifier, a shaper, a leading edge discriminator and a 512-cell analog memory, SCA. The gain, polarity, shaping time and threshold can be programmed individually for each channel by slow-control, SC. Use of external preamplifier and shaper instead of the internal ones is integrated. Shaped signals are continuously sampled (1-100Mhz) and written onto the circular SCA, which are read by an external 12/14bit 25MHz ADC under request. The readout of the SCA can be selective (programmable time window, and selected on only hit channels). Outside this readout phase the same ADC also codes the multiplicity information constructed from the discriminator outputs to give Level-1. Level-0 is an external trigger. Level-2 is an event form recognition trigger preceding the SCA coding and issues a calculated read pattern.

Four AsAds data and control are connected onto a CONcentration BOard, CoBo, employing a FPGA+fast memory. CoBos are housed in a modified microTCA (xTCA compatible) along with the FPGA based trigger MUTANT (MCH1) and 10Gb switch (MCH2). Two further racks containing MUTANTs in a slave mode will run a total of 32k channels. A CPU farm performs the event building, level-3 trigger and data registering under NARVAL (Ref.2). Residing on CoBo is the SC dispatching, data reduction, time stamping and set in generic based firmware. An evolved SC database under ORACLE is operational. Production of the modules is previewed in 2012. We will present results of the prototype GET system-I.

### References

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2. X. Grave <http://informatique.in2p3.fr/?q=user/22> ° GET Project is supported by L'Agence nationale de la recherche, France

### Co-Authors

Shebli Anvar<sup>1</sup>, H. Baba<sup>5</sup>, Pascal Baron<sup>1</sup>, Daniel Bazin<sup>4</sup>, Chiheb Belkhiria<sup>2</sup> , Bertram Blank<sup>2</sup>, Joël Chavas<sup>1</sup>, Patricia Chomaz<sup>1</sup>, Eric Delagnes<sup>1</sup>, Frederic Druillolle<sup>1</sup>, Patrick Hellmuth<sup>2</sup>, Cedric Huss<sup>2</sup> , Eugene Galyaev<sup>4</sup>, Bill Lynch<sup>4</sup>, Wolfgang Mittig<sup>4</sup>, Tetsuya Murakami<sup>5</sup>, Laurent Nalpas<sup>1</sup>, Jean-Louis Pedroza<sup>2</sup>, Riccardo Raabe<sup>3</sup>, Jérôme Pibernat<sup>2</sup>, Bruno Raine<sup>3</sup>, Abdel Rebi<sup>2</sup>, Atsushi Taketani<sup>5</sup>, Frederic Saillant<sup>3</sup>, Daisuke Suzuki<sup>4</sup>, Nathan Usher<sup>4</sup>, Gilles Wittwer<sup>3</sup>,

- 1 CEA Saclay, IRFU/SPhN, Fr
- 2 CENBG, Bordeaux, Fr
- 3 GANIL, CAEN, Fr
- 4 NSCL, MSU, US
- 5 Riken, Japan

**Author:** Dr POLLACCO, Emanuel (CEA Saclay)

**Co-author:** Dr NALPAS, Laurent (CEA Saclay)

**Presenter:** Dr POLLACCO, Emanuel (CEA Saclay)

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