

# Intention to join the RD51 collaboration

Tatsuya Chujo  
Univ. of Tsukuba

RD51 collaboration board  
Trieste, Italy, Oct. 16, 2015



筑波大学  
*University of Tsukuba*

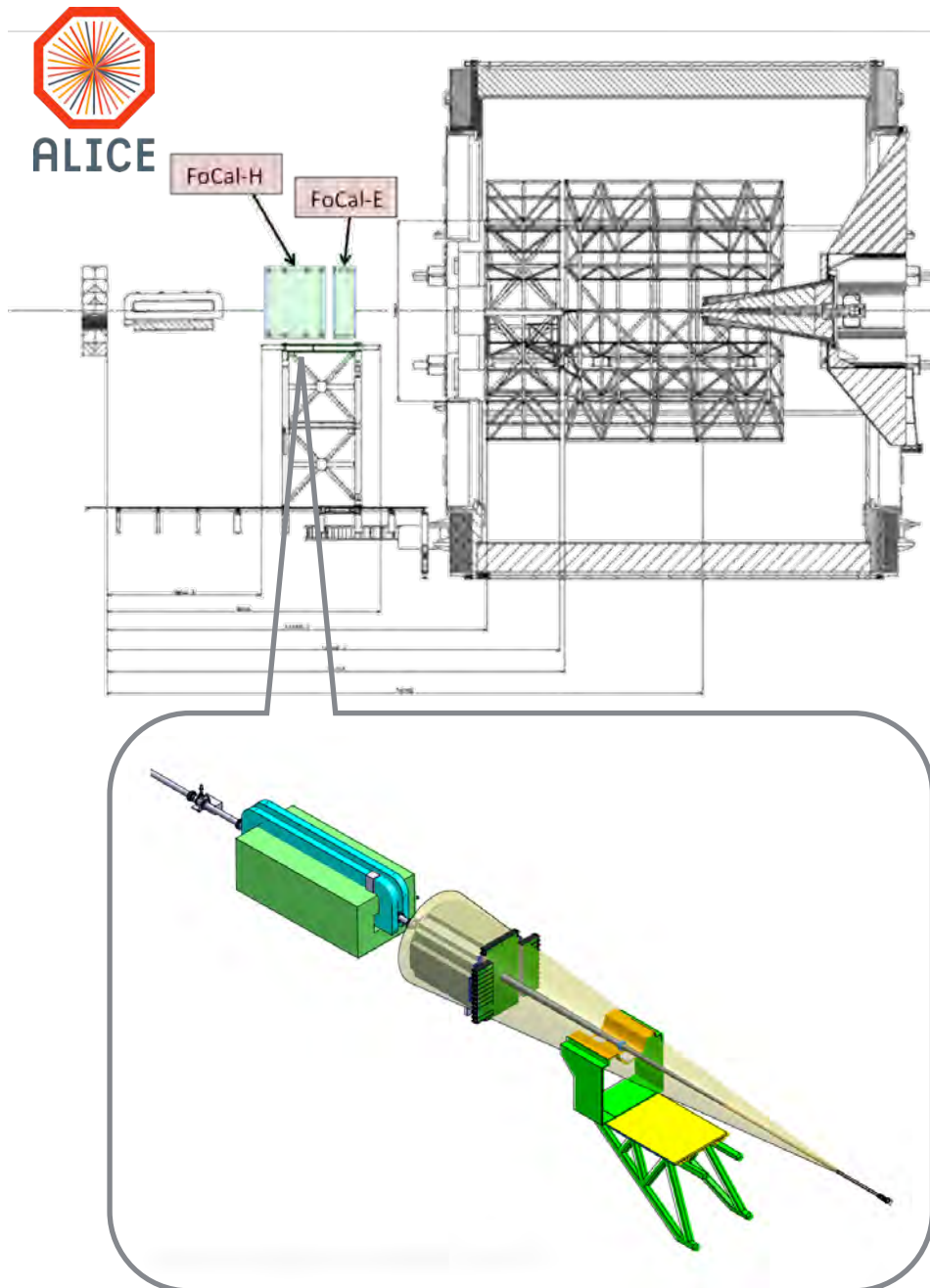
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Motoi Inaba<sup>2</sup>, Yasuo Miake<sup>1</sup>

1.University of Tsukuba (JP)

2.Tsukuba University of Technology (JP)

- Full member of ALICE collaboration.
- about 15 graduate students (10 master, 5 PhD)
- In ALICE, Tsukuba contributes to EMCal/DCal detector construction, operation, photon and jet LI triggers, and physics data analysis.
- We are also working on;
  - 1) **ALICE Forward Calorimeter (FoCal) upgrade**
  - 2) establishing ALICE Tire 2 center in Tsukuba U.

# Forward Calorimeter (FoCal) in ALICE



- **Physics Goals** : discover or discard CGC (Color Glass Condensate), initial condition of Heavy Ion collisions at LHC, probe thermalization mechanism of QGP.

- Electromagnetic calorimeter for  $\gamma$  and  $\pi^0$  measurements, with hadron calorimeter.

- At  $z \sim 8$  m (outside ALICE magnet)

- $3.3 < \eta < 5.3$

- FoCal-E: Combined two different detectors

- **LGL (Low Granularity Layers) = PAD**

- HGL (High Granularity Layers) = MAPS

- **Proposed scheduled**

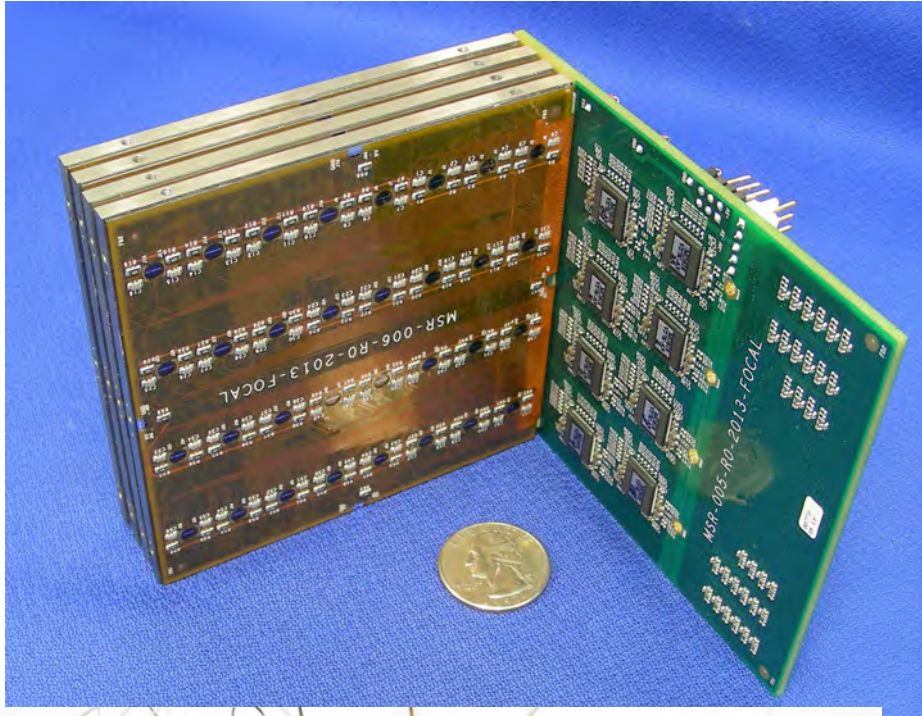
- Lol review in collaboration in 2015

- Lol approval in 2016

- install mini-FoCal in 2019-

- install full FoCal in 2023-

# FoCal Prototypes (LGL PAD Si-W sampling EMCaI)

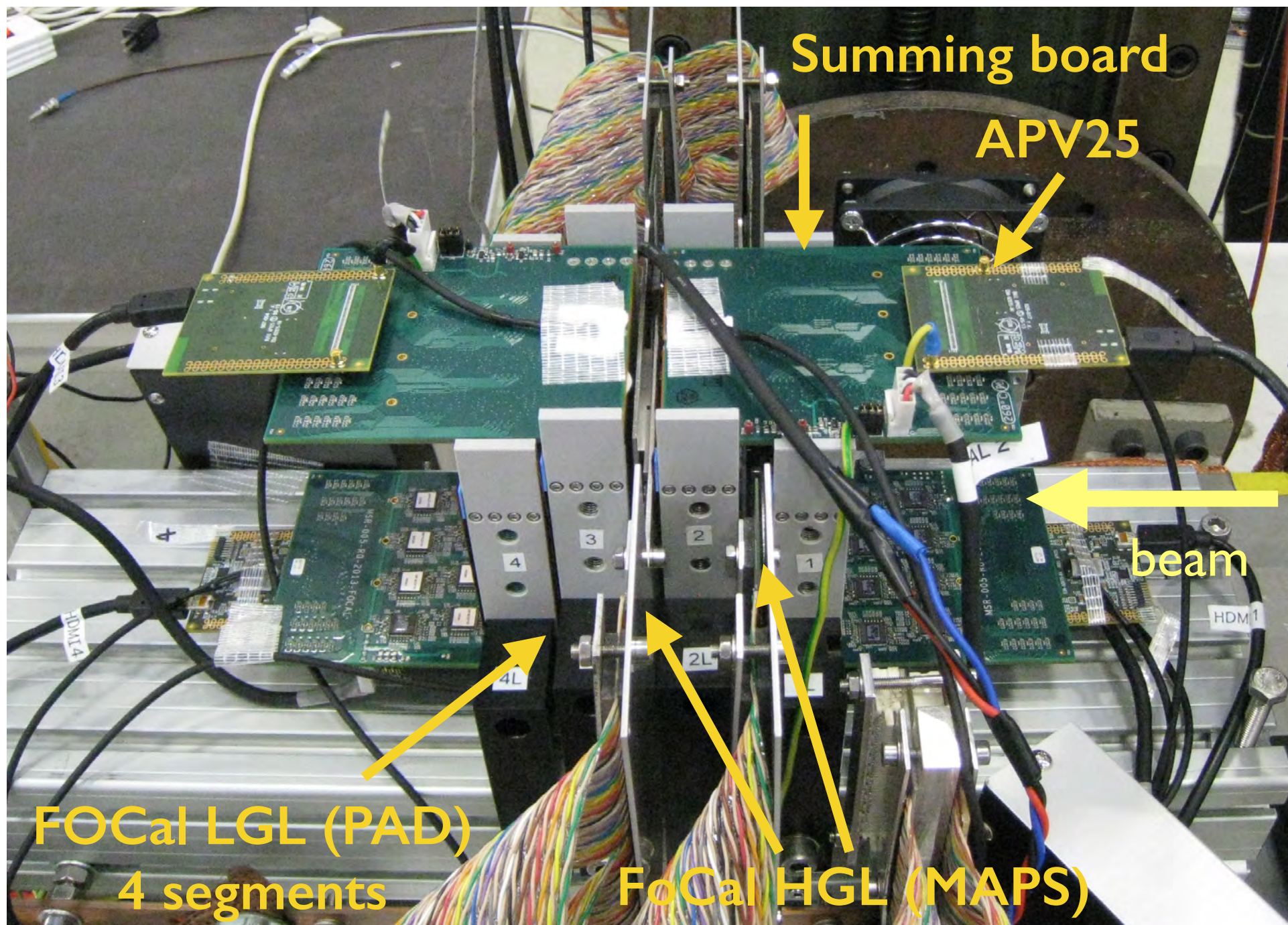


- **LGL (PAD) prototype (ORNL, Tsukuba)**
  - Si-PAD (Hamamatsu S10938)
  - cell size 1x1 cm<sup>2</sup>
  - longitudinally summed (4 layers), analog readout = 1 segment
  - 4 or 5 LGL segments
  - W layer per Si-PAD
- **Current Readout System:**
  - Analog signal summing board (ASICS), ORNL
  - RD-51 SRS system:
    - APV25 hybrid
    - SRS Front End Card (FEC) and ADC.



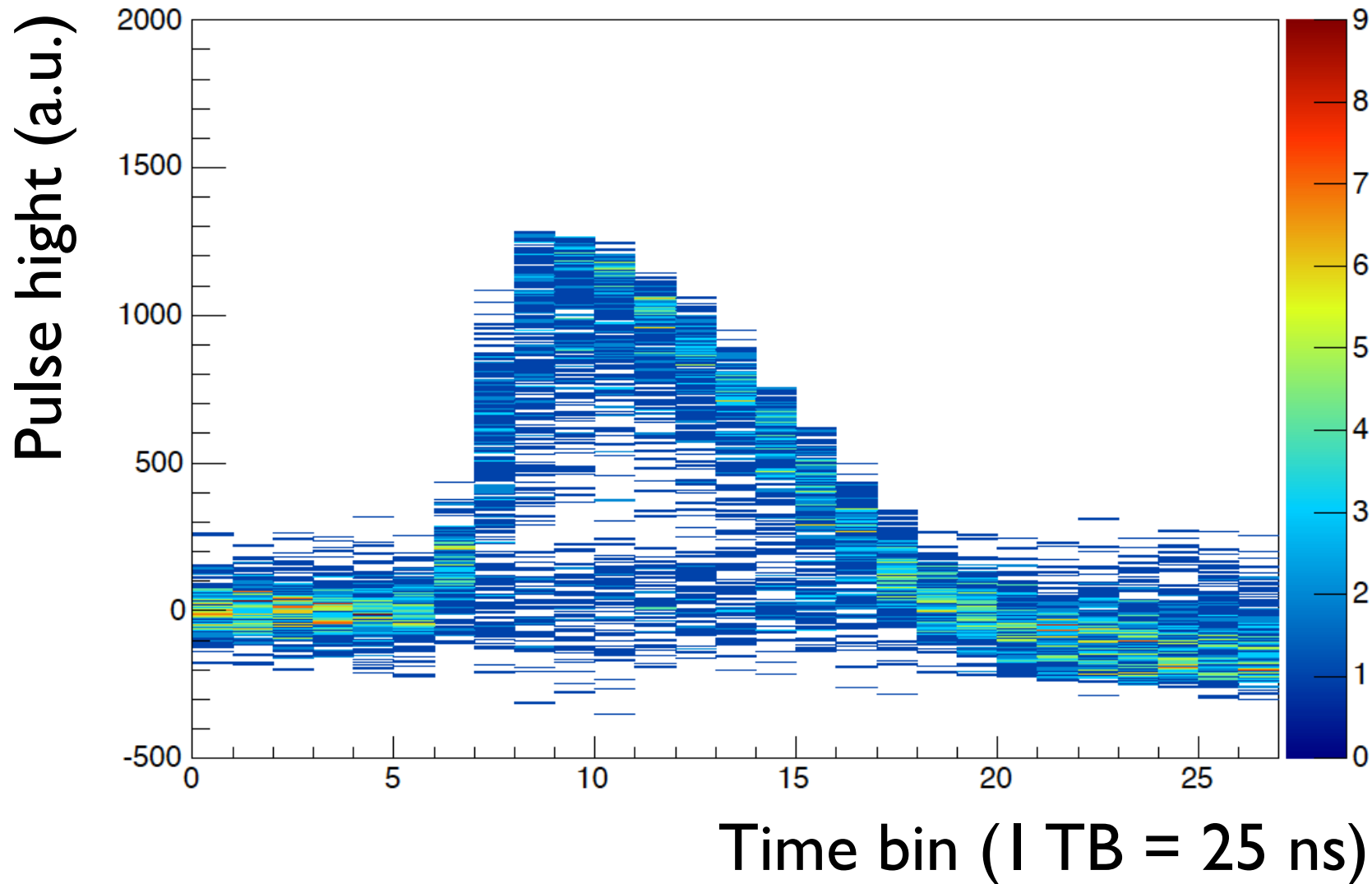


# FoCal detector prototipe (@ PS test beam, Oct. 4 - 14, 2015)



# 2015 PS test beam quick result: pulse shape (PAD)

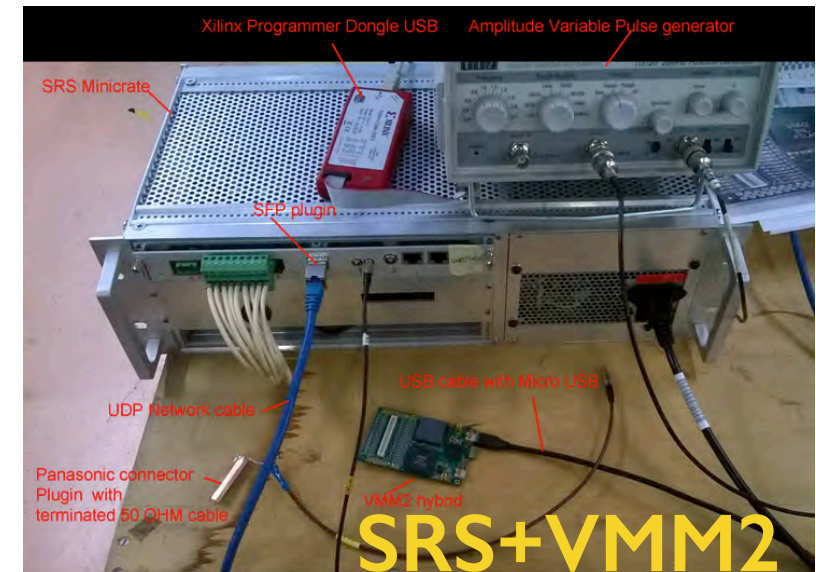
- 4 GeV/c, electron signal from LGL PAD detector





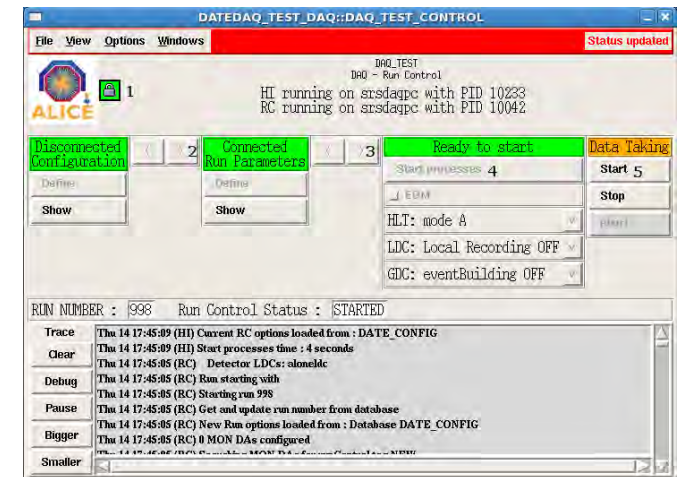
# Current activity w/ RD51

- We are interested in a fast readout electronics for silicon PAD EMCal.
  - Readout rate  $\sim$  few 100 kHz (c.f. APV25  $<$  200-300 Hz) with wide dynamic range (1- 300 GeV EM shower) and trigger capability
- One of the candidate is **VMM2 or later version + SRS system** developed by RD51, BNL-ATLAS
- Start working at WG5: Electronics and Readout systems for MPGD detectors since summer 2015 at CERN
- M. Inaba and B. Kim stayed at CERN from July - August 2015 and tested VMM2 hybrid board at the RD51 lab. at CERN, using D-card, FEC, SRS.
- Developed “VMM-SRS getting started manual” with RD51



# Future work @ RD51 collaboration

- We would like to continue the R&D and test for VMM2 and VMM3 hybrid boards with SRS + DATE (ALICE DAQ) system.
- R&D of combined design; on-board VMM2/3 on FoCal summing board, and modification for FoCal needs (dynamic range & trigger capability)
- Time scale:
  - Finish R&D in 2 years (2016 - 2018)
  - Production in 2019 for FoCal.



ALICE DATE for VMM (developed by RD51)

- **We would like join the RD51 collaboration for the readout electronic system's R&D for ALICE FoCal.**
- **Thank you !**



**Backup**