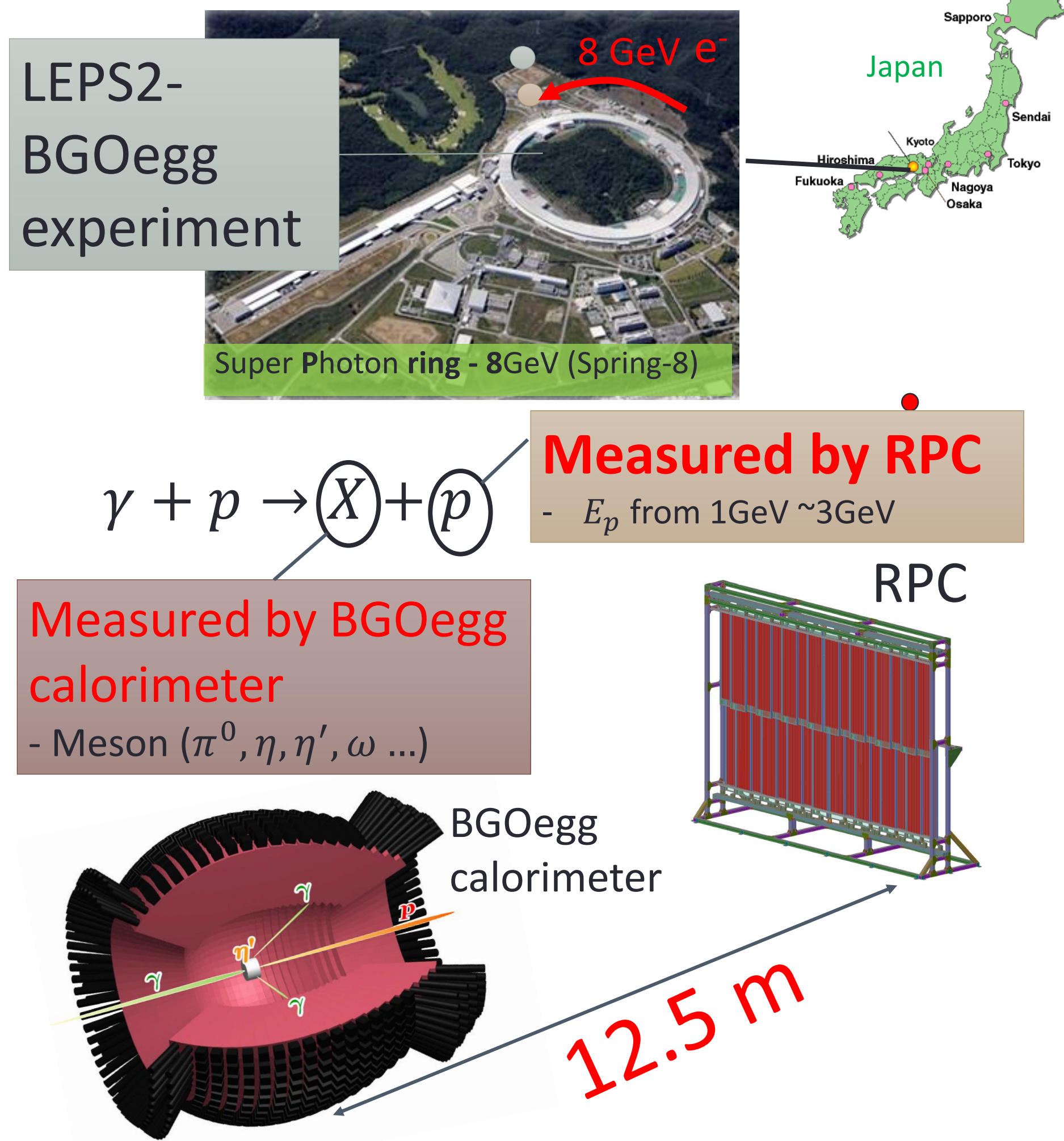


Working status and proton detection of the ToF-RPC at the BGOegg experiment

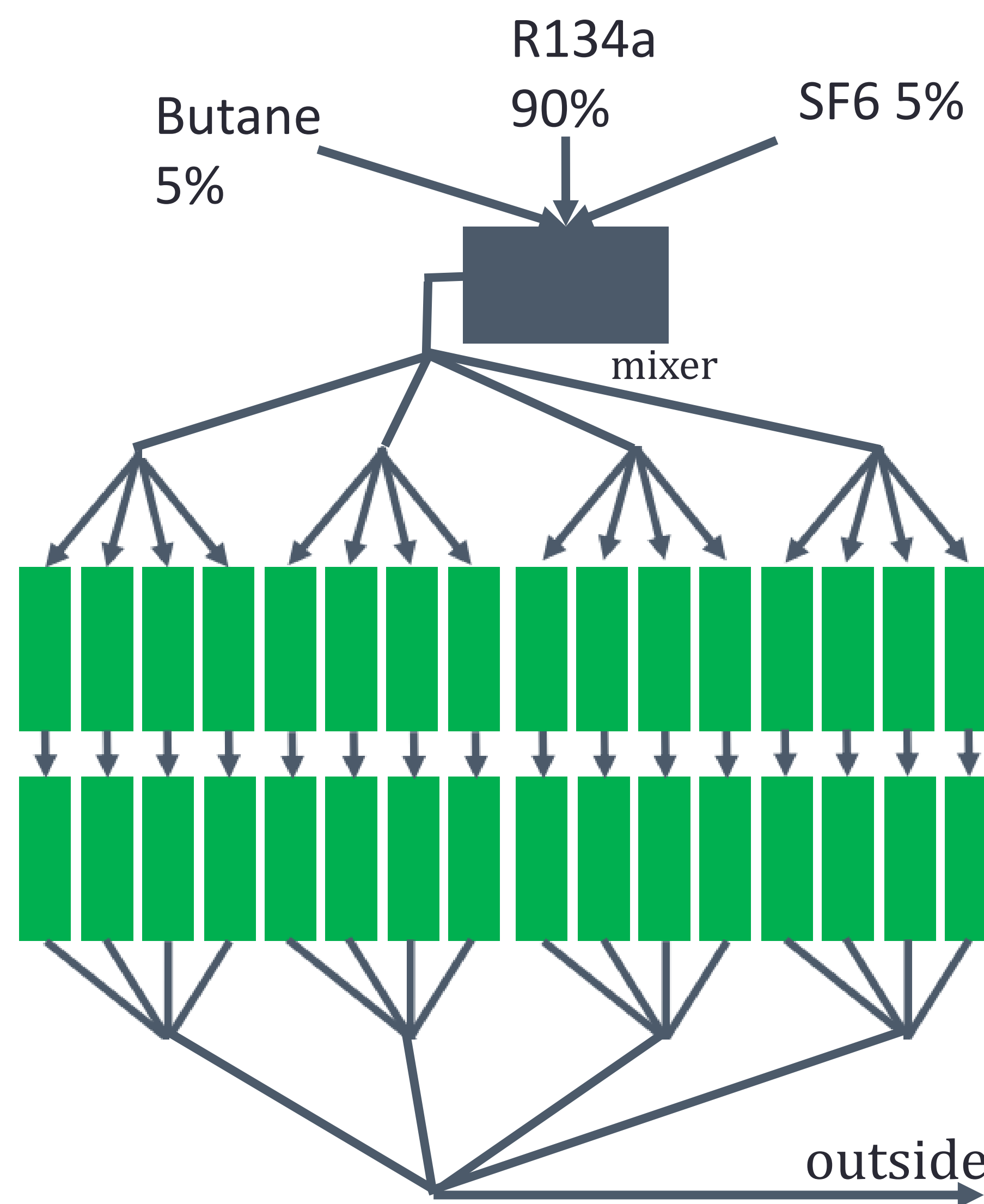
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ABSTRACT

The BGOegg experiment located at SPring-8 Synchrotron radiation facility in Japan was started since April 2014. The main goal of the experiment is to study the photoproduction of hadrons from the interaction of high energy photon beam at LEPS2 beamline [1] and several targets like carbon, liquid hydrogen.

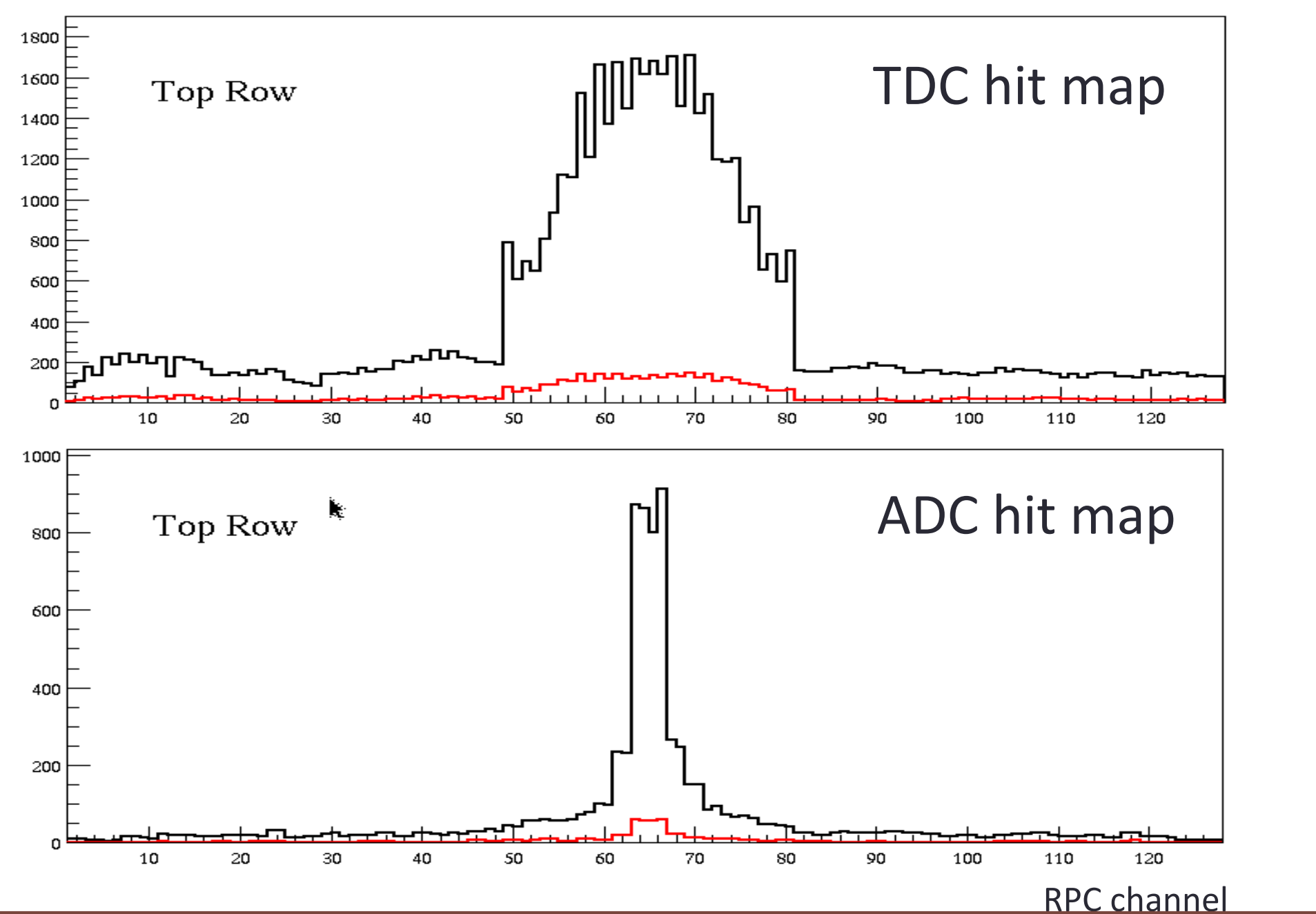


The gas system of our ToF-RPC is not a closed loop system, therefore, we have to replace the gas bottles every few weeks.



The data taking during the 2014B, 2015A and 2015B period was very successful for our ToF-RPC system which operated continuously during the experiential time.

Hit map for online monitoring



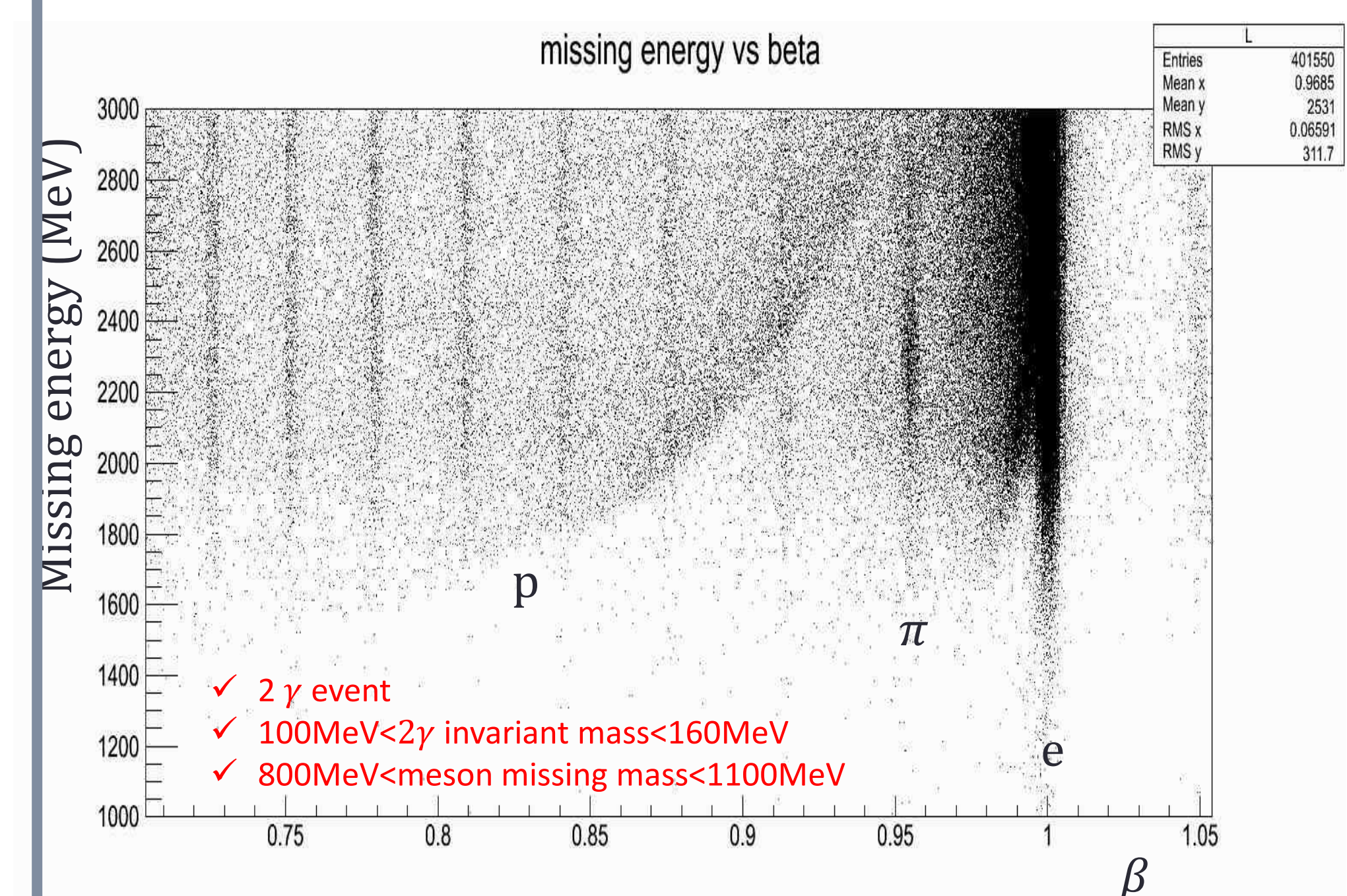
PROTON MEASUREMENT BY RPC

After establishing a suitable calibration method, we have obtained the first physics data from RPC. The initial analysis of the data show excellent performance of RPC in the experiment in term of proton selection, proton velocity measurement.

REFERENCE

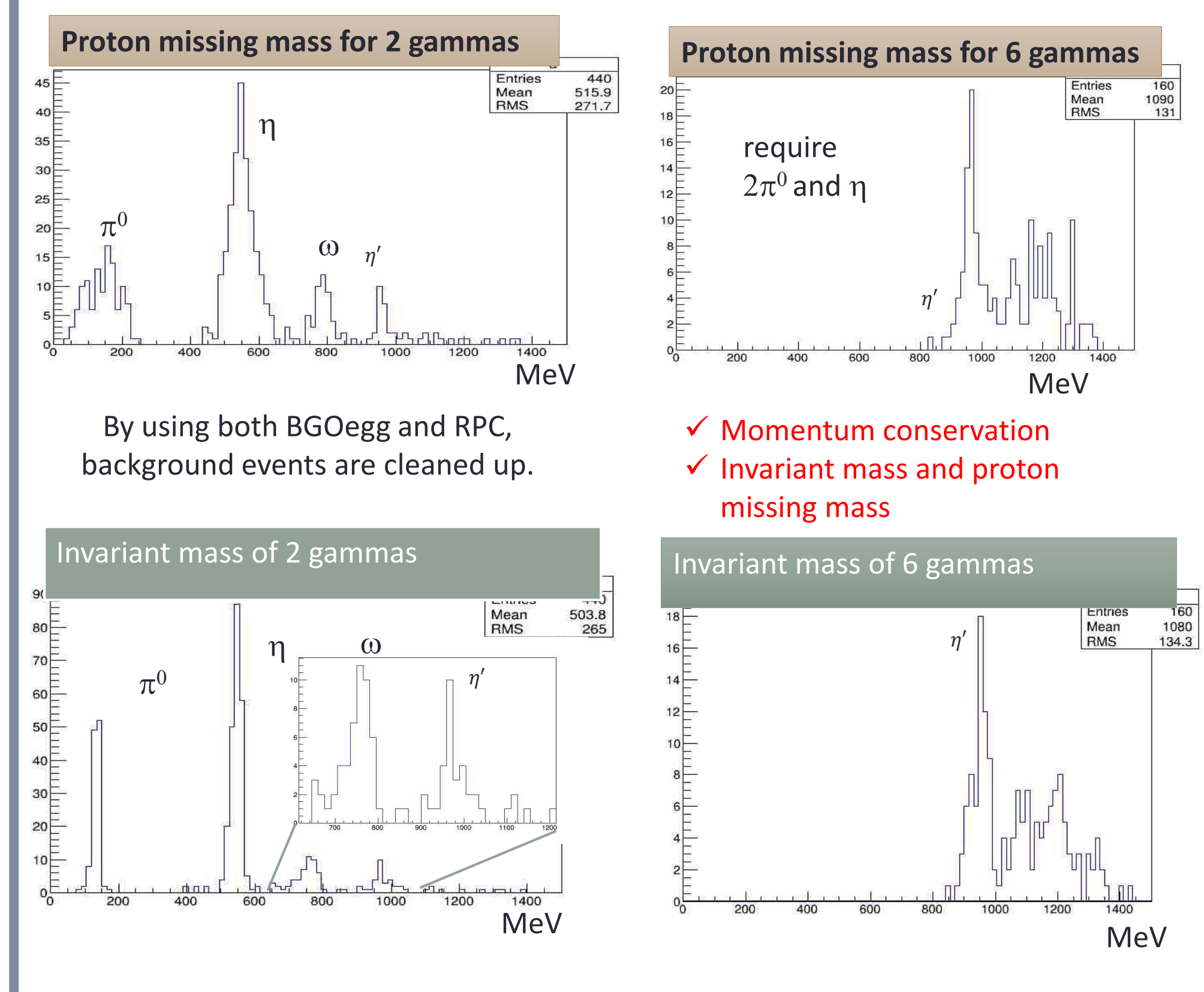
- [1] Muramatsu, Norihito, *First Beam Observation and Near Future Plans at SPring-8 LEPS2 Experiments* arXiv:1307.6411 [physics.ins-det] ELPH-REPORT-2044-13
- [2] N. Tomida, H. Onishi, M. Niiyama, T. Nam, *Large strip RPCs for the LEPS2 TOF system*, Nucl. Instr. Meth. A, 766, 283-287, 2014.

The velocity of proton was measured with the assumption that the velocity of in-coming electron is equal to the speed of light and use the RF signal, with resolution of about 15ps, from SPring-8 storage ring as reference timing.



$$\text{Missing energy} = E_{\gamma} + m_p - E_{\text{meson}}$$

$$\beta = \frac{\text{Flight Length}}{t_{\text{RPC}} - t_{\text{RF}}}$$



CONCLUSION

The RPC system at BGOegg experiment is designed for the purpose of measuring recoiled proton in the 2 body reaction, $p(\gamma,p)X$. The system have been worked stably for 1.5 year without major problem or physical damage. The initial analysis of the collected data show that proton from several reactions can be seen and separated at RPC.

RPC AT BGOegg EXPERIMENT

The ToF-RPC system of BGOegg experiment contains 32 separated RPC, each chamber contain eight 1m-long strips[2]. The distance between the ToF-RPC wall to the target is 12.5m. The experimental resolution of our RPC is 75-100ps.



Read-out electronic

- 9 CAEN V1290A TDCs
- 17 LeCroy Fast Encoding and Readout ADCs (FERAs)
- Custom Discriminator and stretcher
- Pre-amp was installed inside the chamber

