

BUNCH-BY-BUNCH 3D MEASUREMENT SYSTEM IN HLS-II

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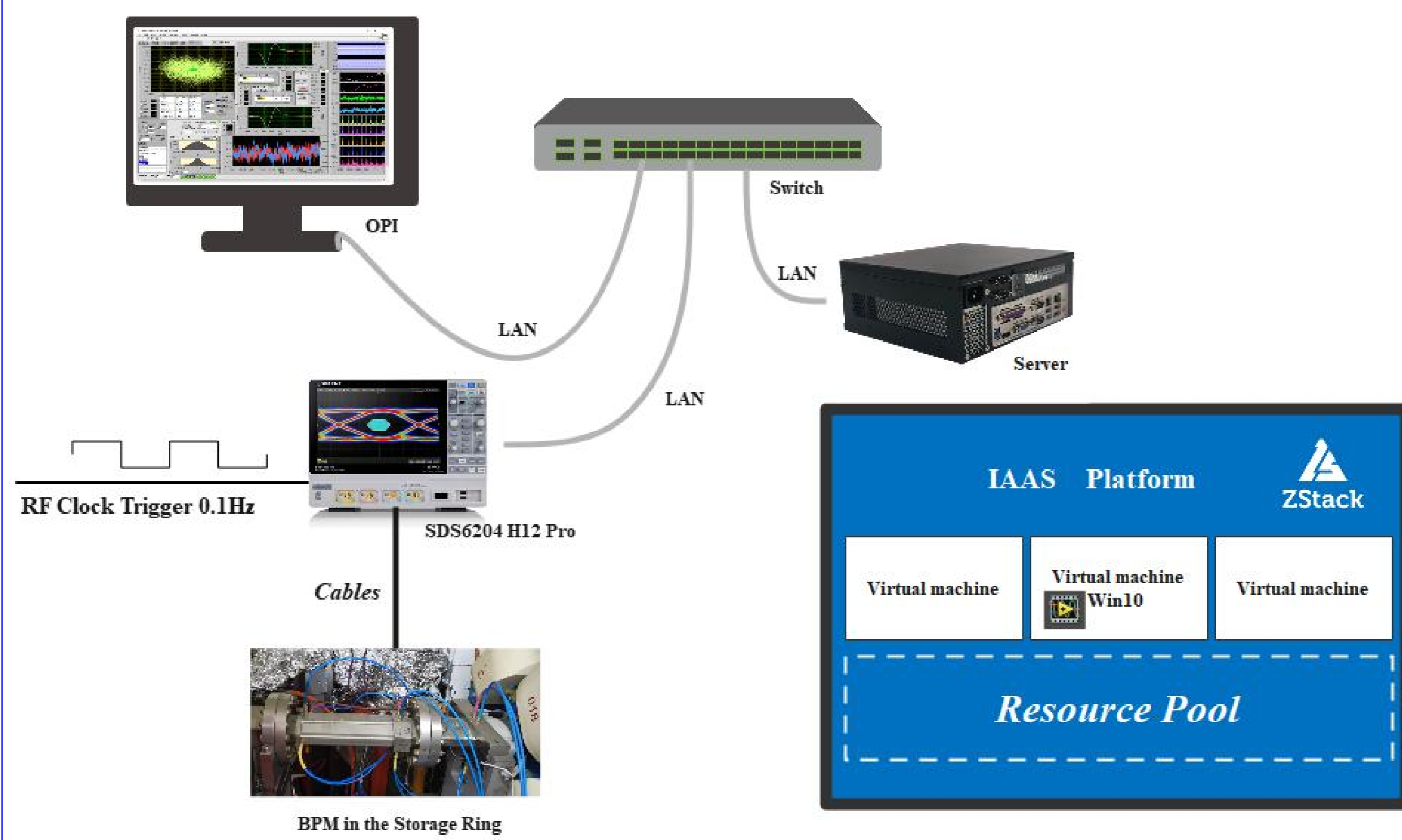
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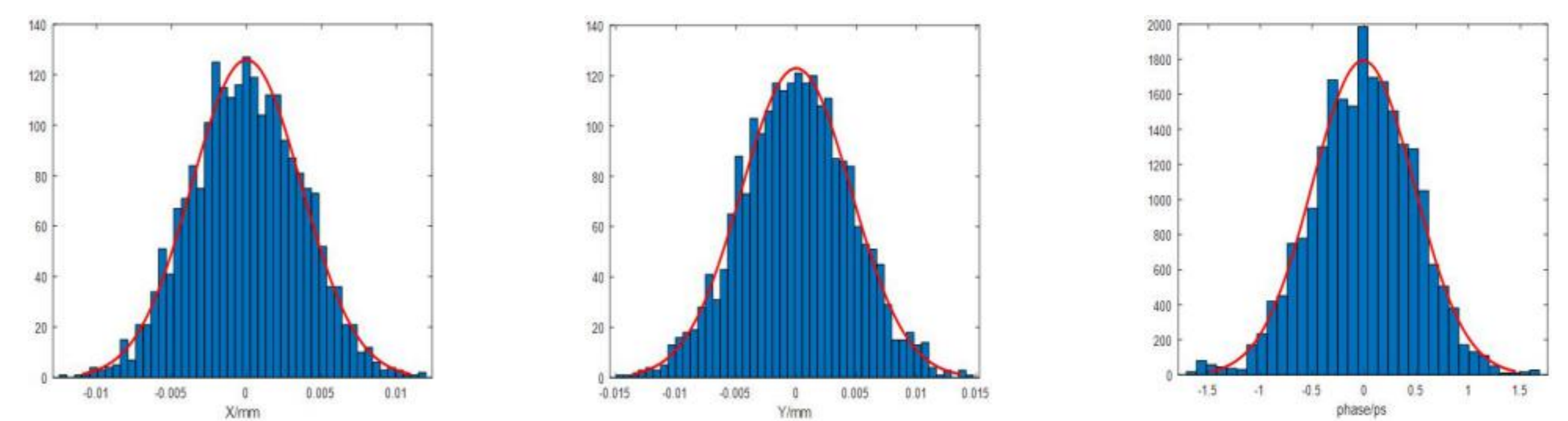
Abstract: In order to improve the performance of Hefei Light Source (HLS-II), it is necessary to study various problems of nonlinear beam dynamics in the storage ring, so as to optimize the beam filling mode and injection mode, and then improve the intensity and brightness of HLS-II. In beam dynamics, bunch-by-bunch can provide detailed information of beam bunches and help beam researchers to study the problems of beam bunches deeper. Therefore, HLS-II diagnostics group has developed an on-line bunch-by-bunch three-dimensional measurement system based on high bandwidth and high speed oscilloscope.

SYSTEM OVERVIEW

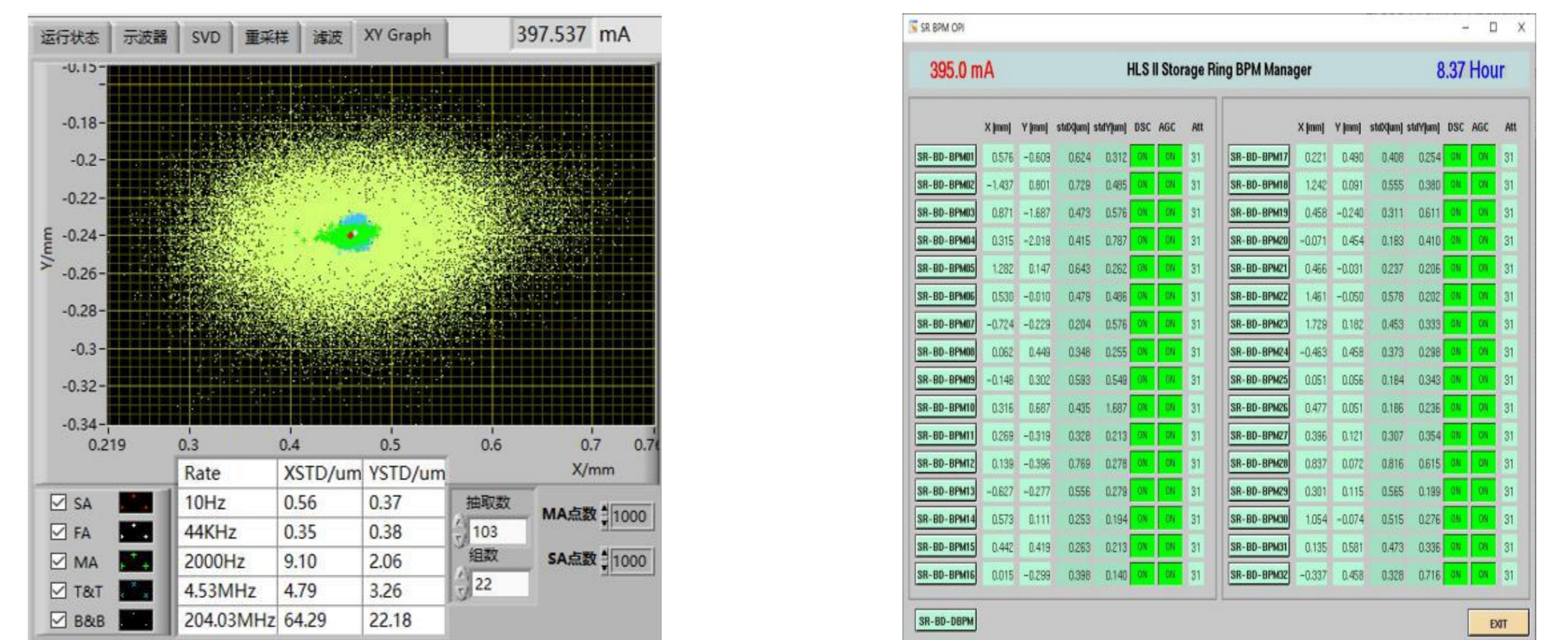


SYSTEM ERROR ANALYSIS

Three Dimensional Error Analysis Diagram



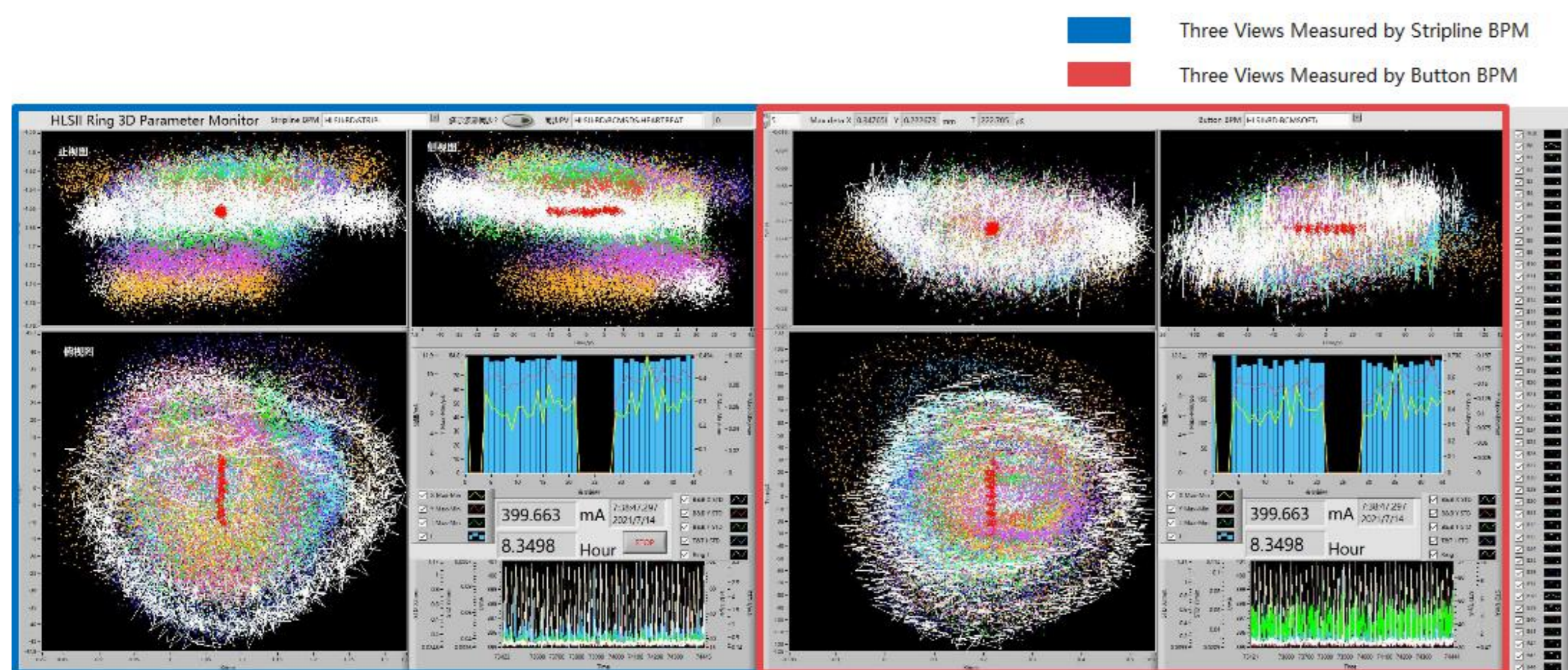
Error Comparison For Short Time



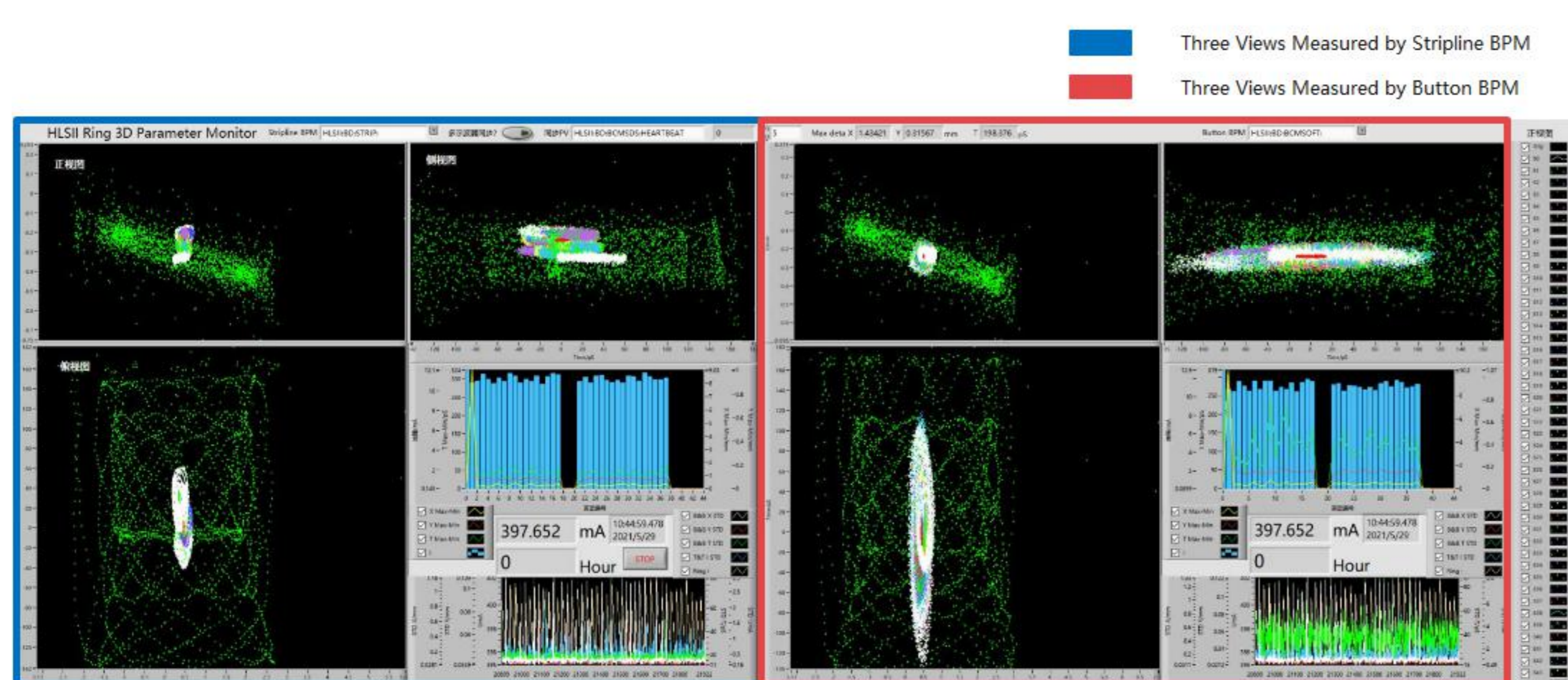
Measurement Results of HLS-II System

Measurement Results of Libera B+

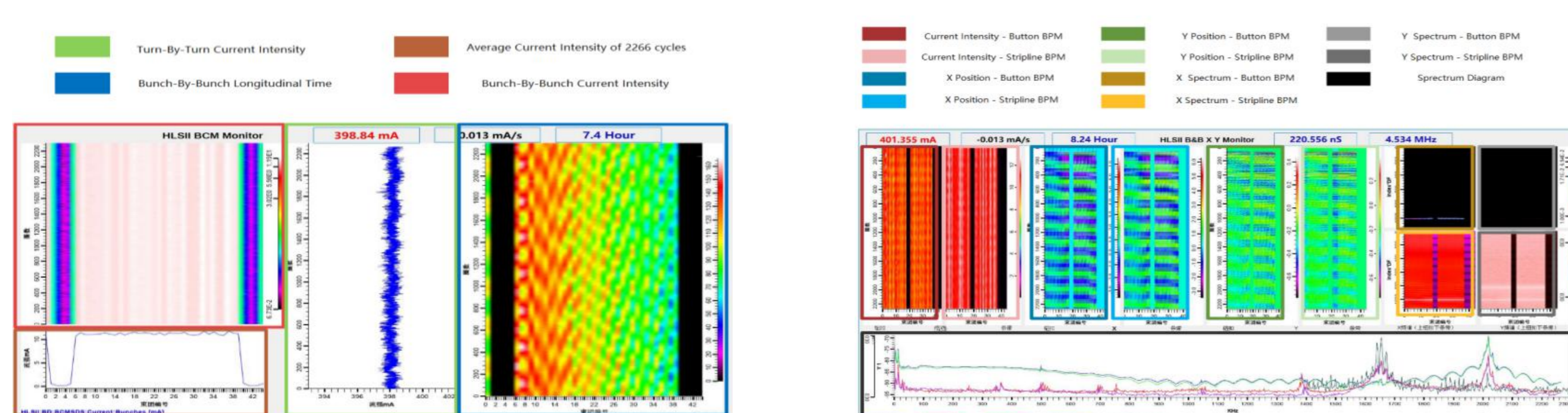
THE MEASUREMENT PRINCIPLE



Three Views For Bunch-By-Bunch Under Normal State

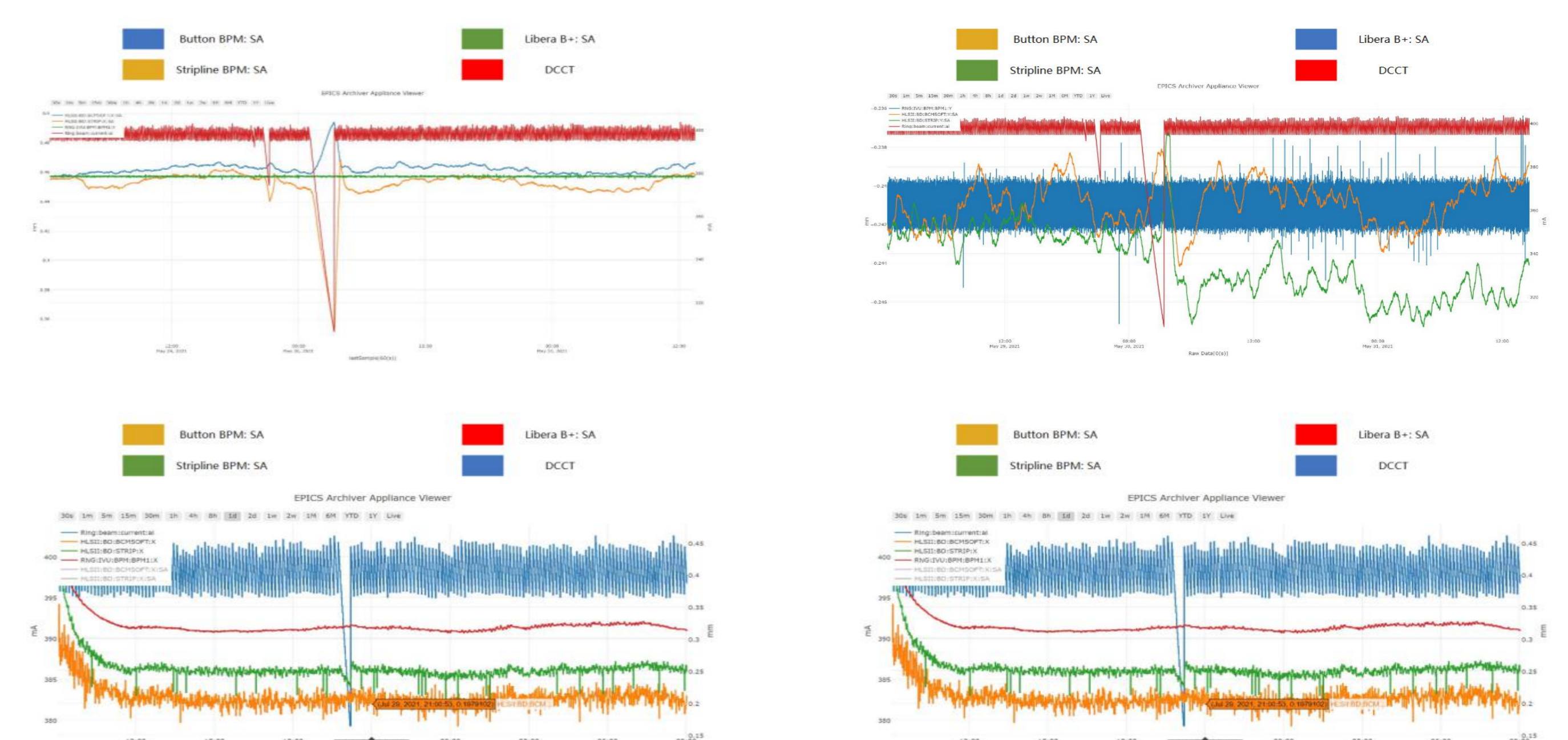


Three Views For Bunch-By-Bunch Under Injection State



Bunch-By-Bunch Tracking Interface

Error Comparison For Long Time



CONCLUSION

The bunch-by-bunch three-dimensional system has been working online in HLS-II. Based on the data generated by this system, a variety of bunch-by-bunch information can be easily obtained. Further, the version 1.0.X of this bunch_x0002_by-bunch three-dimensional system, now is open source on gitee, can easily set parameters to fit all light sources. And the next version system in plan will focus on the six dimensional bunch-by-bunch centroid.

REFERENCES

- [1] SDS6204 H12 Pro oscilloscope <https://www.siglent.com/products-model/sds6000-pro/#navs>
- [2] Zstack IAAS Platform Website <https://www.zstack.io/>
- [3] Gitee Open Source Archives <https://gitee.com/lup9304/Ring3D>