

The construction of a virtual beamline modeled after a HEPS beamline



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Introduction

We have combined 3D modeling technology and optical ray tracing calculations, based on Unity engine and EPICS, to construct a three-dimensional virtual beamline. The virtual beamline allows users to have a more intuitive perception of the experimental equipment in conditions closer to real scenarios.

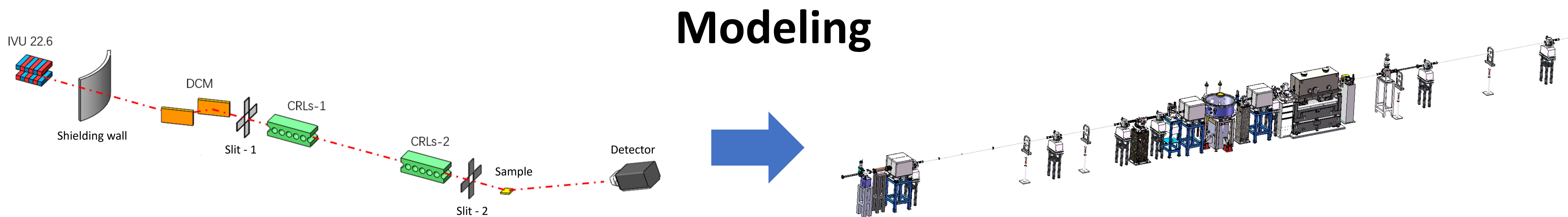


Fig.1 From optical layout to engineering models

The engineering models could be utilized as the protocol of the virtual beamline models.

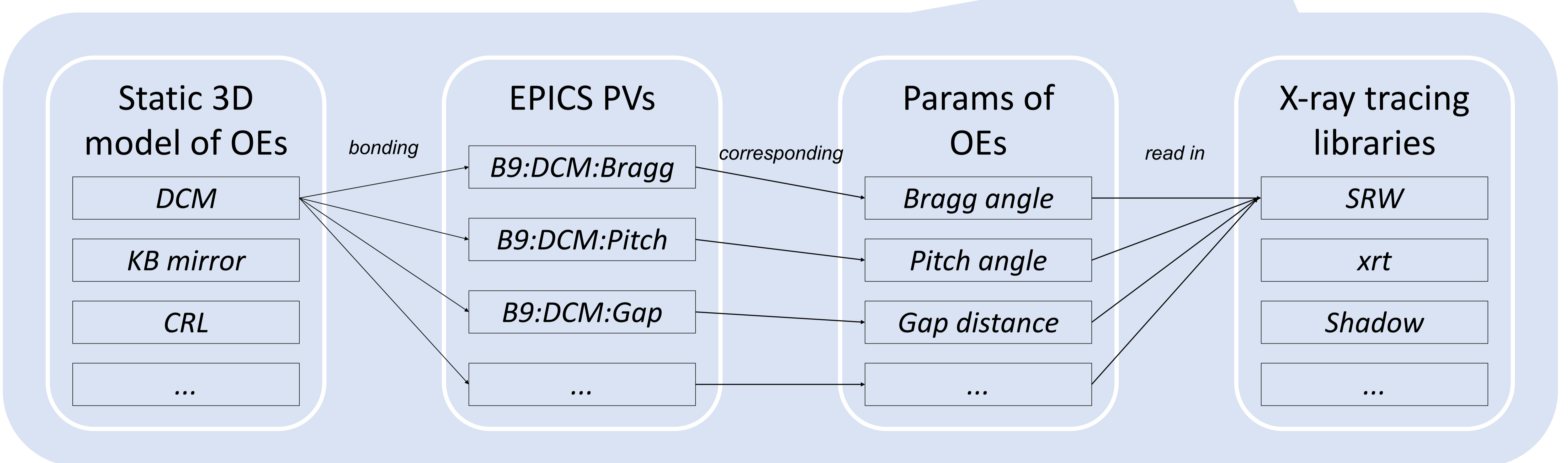
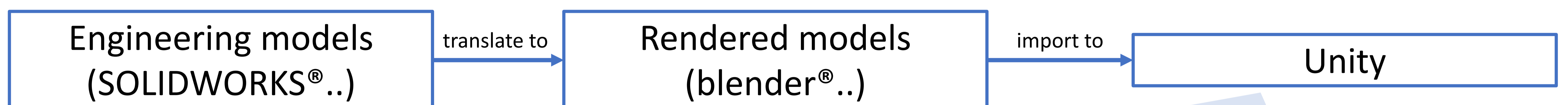


Fig.2 Scheme of the virtual beamline combining with x-ray tracing

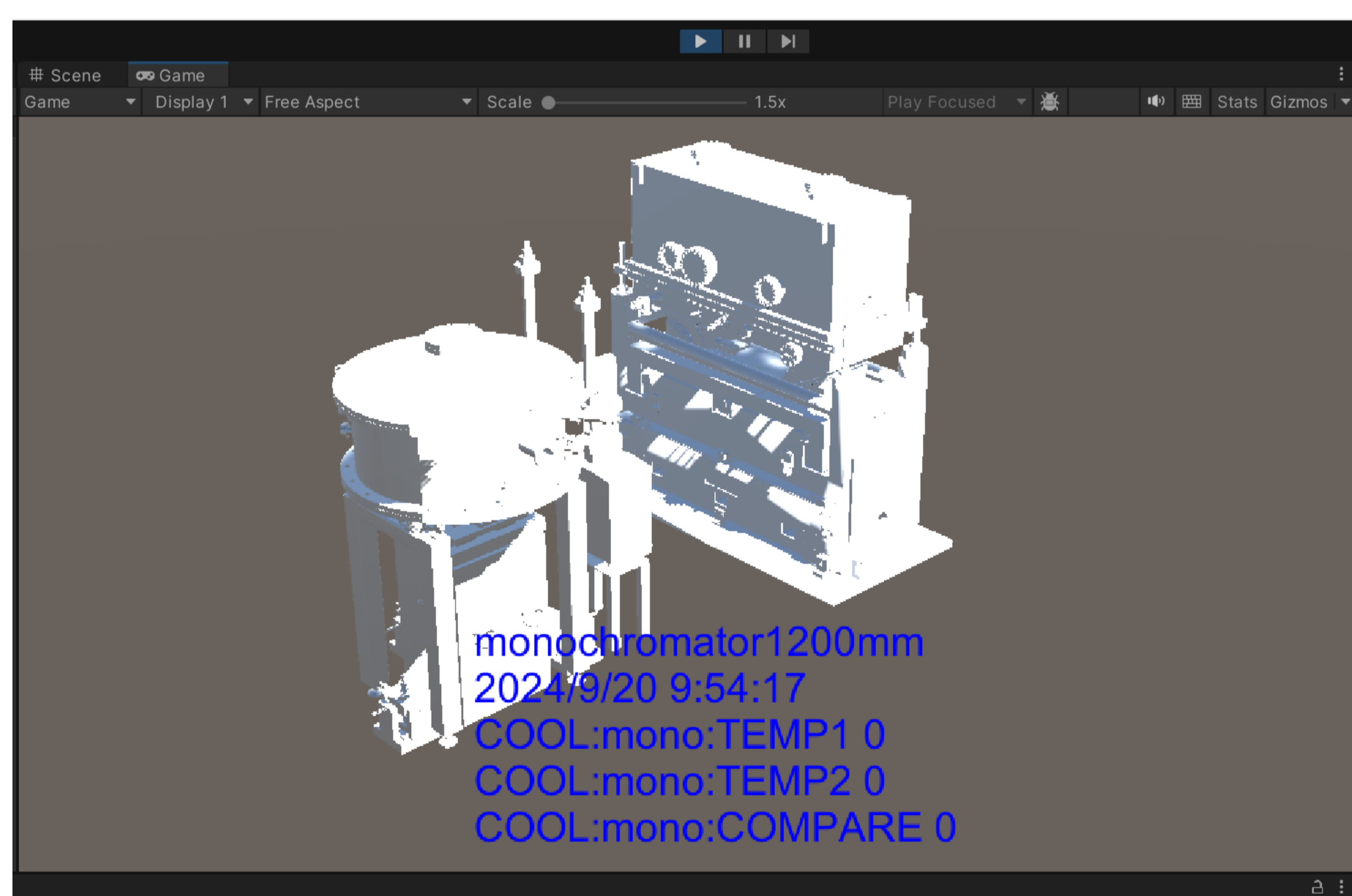


Fig.3 A virtual monochromator which can read its bonding EPICS PVs in a Unity® project

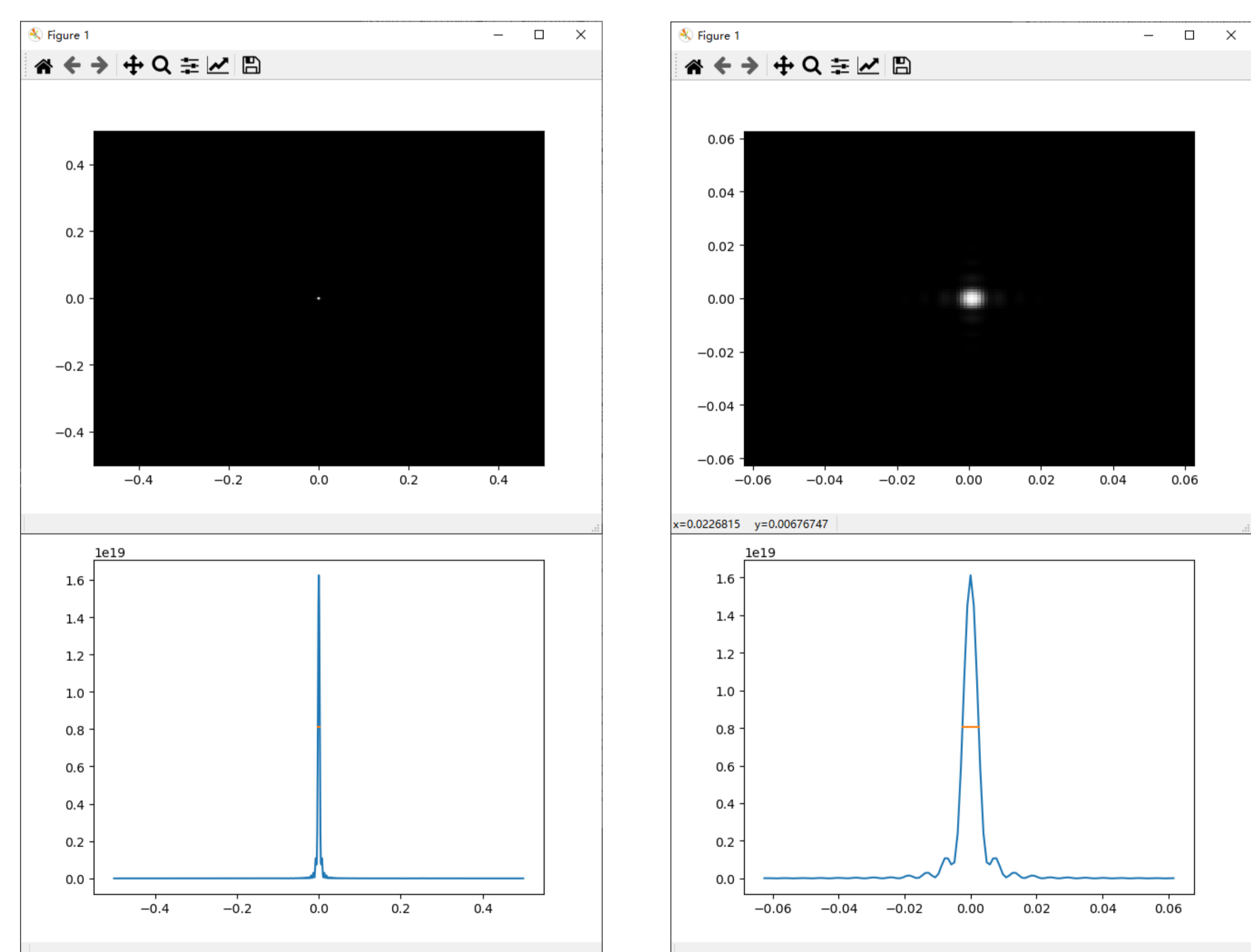


Fig.4 X-ray tracing calculation result while reading different PVs

Conclusion

- Unity can be used for 3D visualization of beamlines
- X-ray tracing calculations can be directly read from EPICS PV
- A flexible and safe testing environment has been built for experimentation
- The flexibility of the Unity engine has expanded the ways of interacting with beamlines

