# In-situ and Operando Bragg Coherent X-ray Diffractive Imaging

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The 34-ID-C beamline at the Advanced Photon Source (APS) is dedicated to Bragg Coherent X-ray Diffractive Imaging (BCDI) which is one of the most powerful x-ray imaging techniques to map three-dimensional lattice deformation and defects in materials at the nanoscale [1]. Therefore, BCDI has been employed to study metal, metal oxide, and mineral materials nondestructively. Nowadays, in-situ and operando nanoscale imaging is a major tool to address scientific questions in physics, chemistry, and material science. As world leading synchrotrons are upgraded to deliver orders of magnitude more coherent photons, a new beamline at APS, named ATOMIC, will take advantage of the upgrade to conduct extremely high resolution BCDI with in-situ and operando sample environments.

In this talk, I will introduce recent experimental results on in-situ and operando BCDI. The first example is high temperature BCDI including annealing effects on nanodiamonds [2] and gold grains in thin films [3]. The second is strain development and/or dislocation dynamics during catalytic reaction on platinum [4], phase transition of palladium under hydrogen flow [5], and charging/discharging process on battery materials [6]. In addition, current status of BCDI and some estimates of the future of BCDI at ATOMIC beamline will be also discussed.

## References

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