

DEMONSTRATION OF MICRO-COMPUTED TOMOGRAPHY AND XRD TEXTURE DATASETS USING VIRTUAL REALITY TOOLS

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Advancements in computer technology have enabled three-dimensional (3D) reconstruction, data-stitching, and manipulation of 3D data obtained on X-ray imaging systems such as micro-Computed Tomography (μ -CT). Likewise, intuitive evaluation of these 3D datasets can be enhanced by recent advances in Virtual Reality (VR) hardware and software. Additionally, the generation, viewing, and manipulation of 3D X-ray diffraction datasets, such as pole figures employed for texture analysis, can also benefit from these advanced visualization techniques. We present newly-developed protocols for porting 3D data (as TIF stacks) into a Unity gaming software platform so that data may be toured, manipulated, and evaluated within a more-intuitive virtual reality environment. We demonstrate this capability by rendering μ -CT data of a polymer test bar at various stages of in-situ mechanical strain. An additional experiment is presented showing 3D XRD data collected on an Aluminum part with microstrain. This 3D texture analysis data (χ , ϕ , 2θ dimensions) enables the viewer to visually inspect 3D pole figures and visually detect the presence of residual macrostrain, a symptom of a future failure mechanism. These two examples serve to illustrate the benefits of this new methodology for multidimensional analysis. **This demonstration will employ both on-screen visualization via a laptop and immersive visualization via the Oculus Rift VR headset and Xbox game controller.**