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Exploring structural heterogeneity using X-ray single particle imaging and deep learning

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Single particle imaging (SPI) with X-ray free-electron lasers (XFELs) sources can empower visualization of structural heterogeneity in biological entities such as viruses and complex proteins. We have developed a CNN-based generative network approach for mapping and reconstruction of the 3D structure of a target object at any point of its structural variation landscape. We discuss applications to ultrafast melting of gold nanoparticles and to natural variations in a virus structure.

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