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Supporting information for article:

Multi-wavelength Bragg coherent X-ray diffraction imaging of Au particles

F. Lauraux, T. W. Cornelius, S. Labat, M.-I. Richard, S. J. Leake, T. Zhou, O. Kovelanko, E. Rabkin, T. U. Schülli and O. Thomas

Post expansion method

The post expansion method, which first expands the support by a certain number of pixels *p*, then shrinks it by two times *p* and finally expands it by *p*, eliminates artifacts appearing outside of the reconstructed object. As illustrated by Fig. S1(A), artefacts exist outside of the support when the post expansion method is not applied while they are strongly reduced when applying this method (Fig. S1(B)). These artefacts can be further attenuated when modulating the phase with the opacity as demonstrated in Fig. S1(C) and (D).

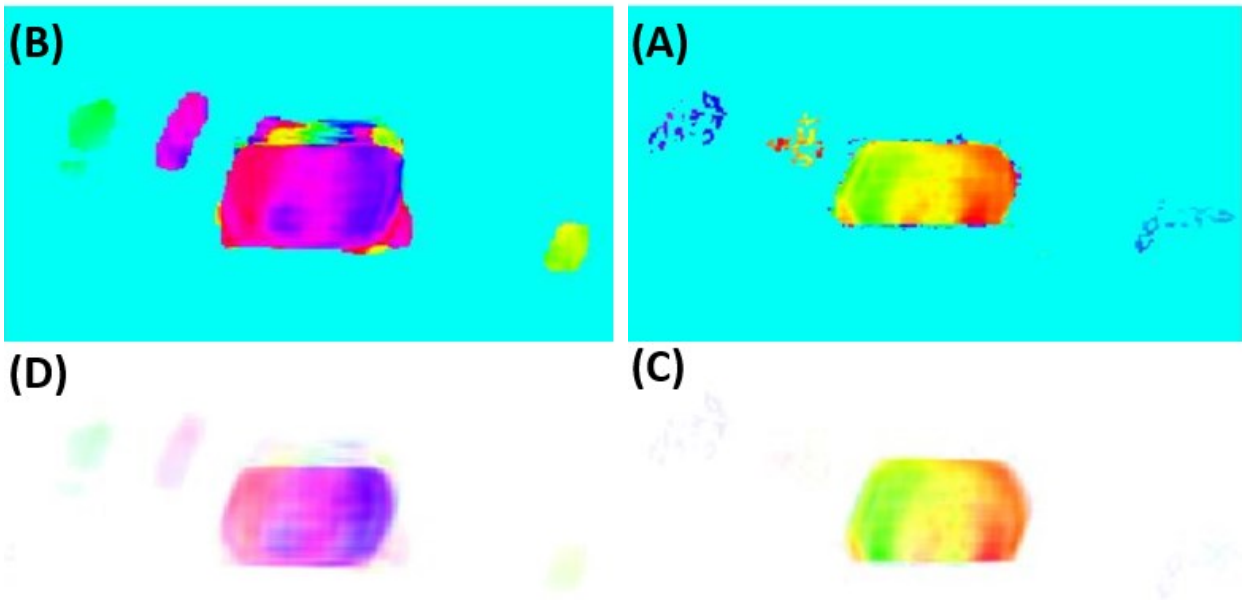

Fig. S1: Phase of the reconstructed object (A) with and (B) without applying the post expansion method. Phase modulated with opacity (C) with and (D) without using the support post expansion method.

X-ray beam induced deposition of carbon

The sample was imaged by scanning electron microscopy after multi-wavelength Bragg coherent X-ray diffraction imaging revealing a strong deposition of hydrocarbons in the area illuminated by the highly focused and intense hard X-ray beam as illustrated by Fig. S2. This X-ray beam induced deposition (XBID) probably causes the evolution of the phase field in the Au crystal under study reported in the main text of this article.

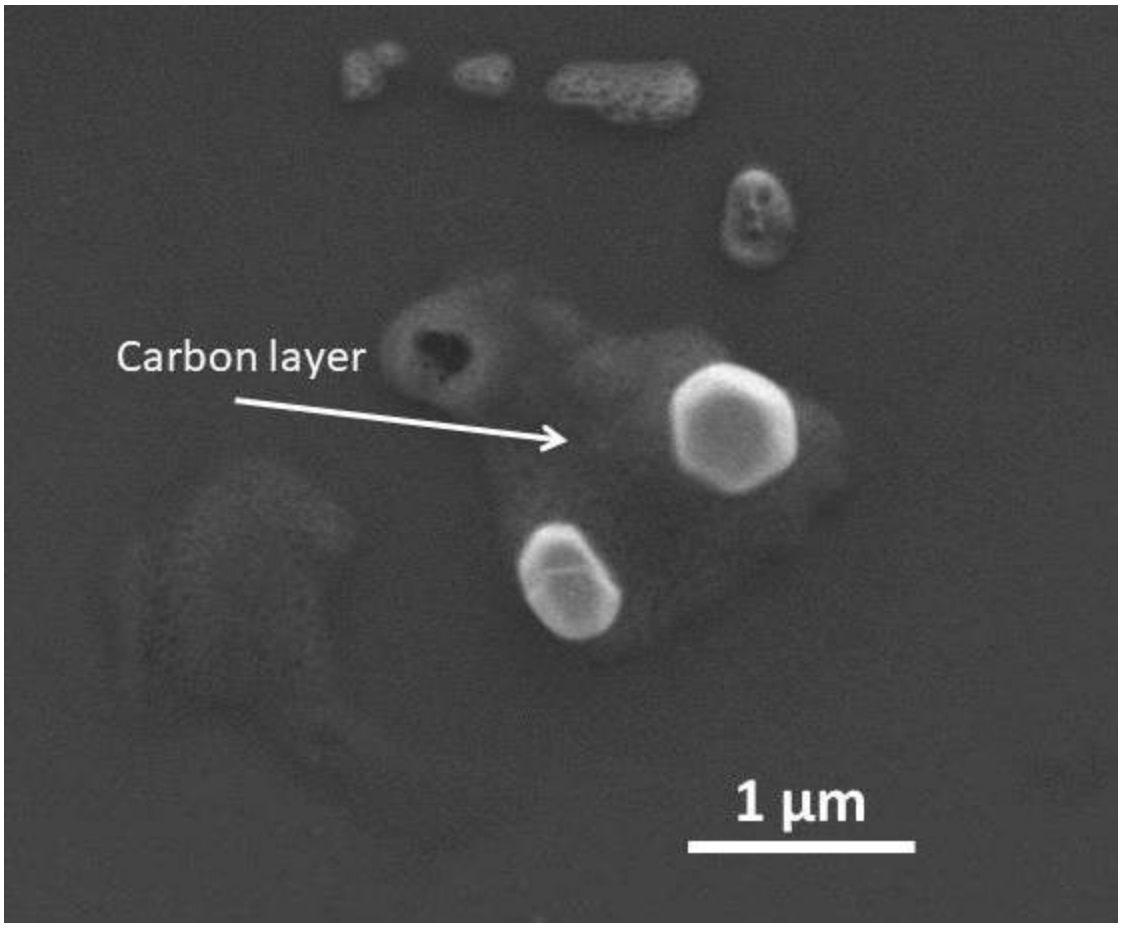

Fig. S2: Scanning electron micrograph of the Au crystal under study revealing a carbon layer which was probably deposited by the intense hard X-ray beam during mw-BCDI experiments.

Displacement of Au crystal during rocking scans

Figure 3 shows the line scans recorded along the X-ray beam direction for three different rocking angles within an angular range of 0.6°. As illustrated by these line scans, the Au crystal moves by 0.83 µm per degree when varying the incident angle demonstrating that the crystal would actually move out of the X-ray beam focal spot without any supplementary alignments during rocking scans.

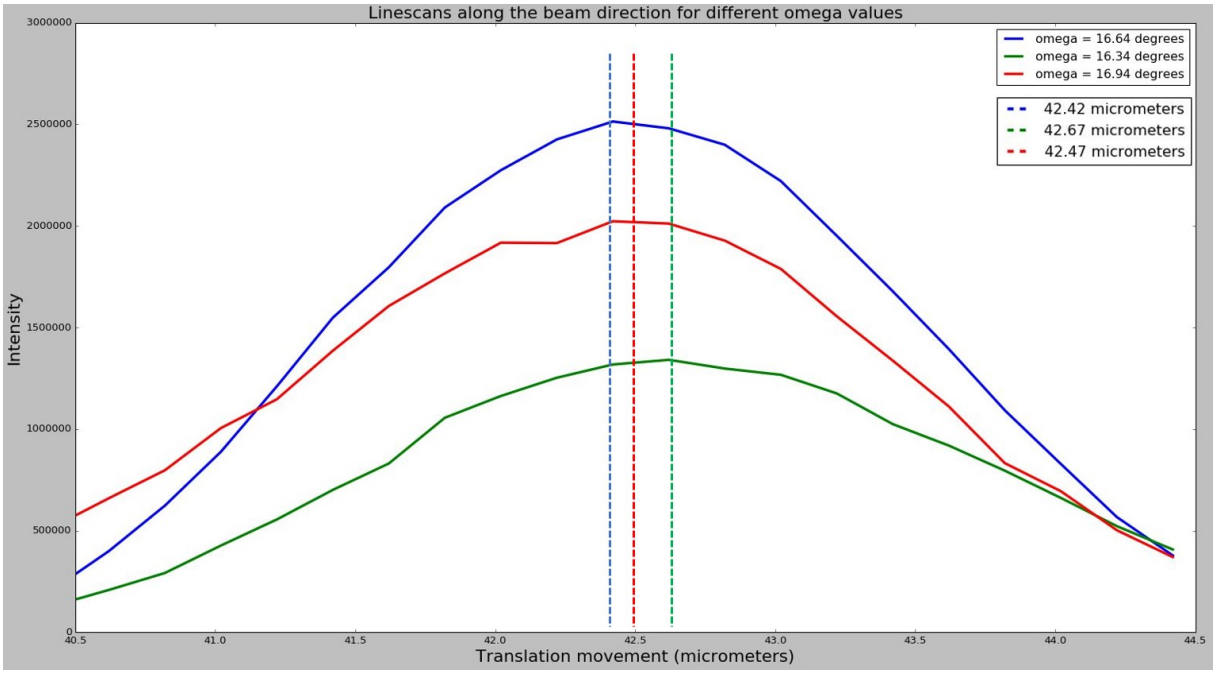

Fig. S3: Linescans along the beam direction for different omega values, illustrating the movement of the Au crystal during a rocking curve.