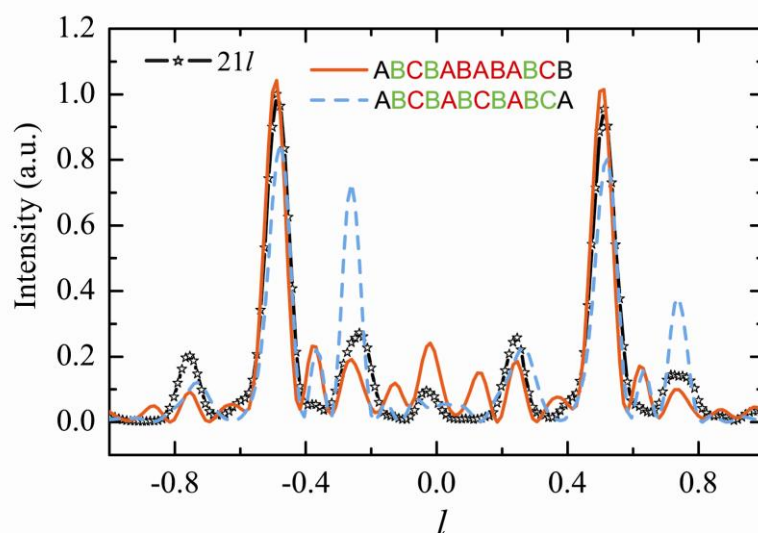


## Supporting information

### S1. Sensitivity of Model

To illustrate the sensitivity of the intensity profile along the Bragg rods to the exact sequence, and thus the strength of this analysis route, we show two d.h.c.p. structures with two other small changes in the d.h.c.p. sequences for the  $21\bar{1}$  rod in Figure S1. The two profiles sequences are ABCBABABABCB and ABCBABCBABCA, in which the differences with the d.h.c.p. stacking are the middle and last layer, respectively. These both change the number of f.c.c. and h.c.p. layers in the structure and clearly have a dramatic effect on the final model  $I(l)$  where peak position, shape and intensity are clearly mismatched with the experimental data.



**Figure S1** Normalized experimental  $21\bar{1}$  rod profile with modelled profiles for two different d.h.c.p. stacking sequences, with a different middle or end layer than a perfect d.h.c.p. structure, showing the sensitivity of the model to a sequence change.