Dual Image Analyser-Based Phase Contrast X-Ray Imaging of Small Animals.

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Analyser-based phase contrast X-ray imaging can provide high contrast images of biological tissues with exquisite sensitivity to boundaries between tissues. The phase and absorption information can be extracted by processing multiple images acquired at different analyser orientations. Recording both the transmitted and diffracted beams from a thin Laue analyser crystal can make possible phase retrieval for dynamic systems by allowing full field imaging. The thorax of a mechanically ventilated newborn rabbit pup was imaged using this technique using a 26 keV beam from the SPring-8 synchrotron radiation facility. The diffracted image was produced from the (111) planes of a 50mm x 40mm, 95 micron thick Si(220) surface-cut analyser crystal. The beam and analyser were sufficiently large to encompass the thorax of the rabbit pup, making it possible to observe changes in anatomy with high contrast and spatial resolution.

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