

New motion based kinetics X-ray imaging modality

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A new X-ray imaging method was developed to visualize function-related motion information usually discarded as “motion artifact”. We modify existing X-ray imaging methods to provide four images without increasing the necessary measurement time or radiation dose. The most important of these images is a new “kinetic” image that represents motions inside the object or living body. The motion-based contrast of the kinetic image can help visualize details that were not accessible before.

The broad range of the movements and high sensitivity of the method are illustrated by imaging the mechanics of a working clock and the chest of a living African clawed frog (*Xenopus laevis*). The heart, valves, aorta and lungs of the frog are clearly visualized in spite of the low soft tissue contrast of the animal. The static image shows practically the same information as the conventional image. The new technology presents two more images which show the point-wise errors of the static and kinetic images which are very important for computer-based noise reduction and data analysis.

The new technology could be used in imaging cardiopulmonary movements, non destructive testing, or port security screening.