X-Ray Phase Contrast Imaging Using Standard Equipment

INVENTORS • Guang-Hong Chen

WARF: P130340US01

View U.S. Patent No. 9,155,510 in PDF format.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for generating X-ray phase contrast images using conventional X-ray imaging systems.

OVERVIEW

Phase contrast imaging exploits differences in the refractive index of materials to differentiate and image them. Recently, X-ray phase contrast imaging has attracted a great deal of attention. In the process, an X-ray detector converts phase variations into intensity variations as the beams pass through a subject.

Compared to normal absorption X-ray imaging, phase contrast imaging provides higher contrast and makes it easier to see smaller details. However, a major disadvantage is the sophisticated equipment that is required (e.g., synchrotron, high resolution detectors, etc.). This has hampered widespread implementation.

To be more practical in a clinical setting, a new approach must not involve specialized equipment or increased dose exposure to patients.

THE INVENTION

A UW–Madison researcher has developed a method for generating X-ray phase contrast images from conventional X-ray attenuation data.

First, calibration factors are obtained using a phantom. The patient or object then is X-rayed to acquire attenuation data at two different energy levels. Images are reconstructed at the different energy levels to produce spatial maps. Based on the calibration factors and spatial maps, a phase contrast image can be produced.
APPLICATIONS

• Phase contrast imaging software
• Any dual-energy computed tomography (CT) system
• Diagnostic CT, image-guided interventions and radiation therapy, tomosynthesis used in breast imaging, diagnosis of diseases like gout and arthritis

KEY BENEFITS

• Practical in a clinical setting
• Requires no specialized hardware or modifications
• Can be implemented in currently available X-ray imaging systems

ADDITIONAL INFORMATION

Related Technologies
WARF reference number P130360US01 describes a method for generating multi-energy medical images of a subject using a single-energy X-ray source.

Tech Fields
Medical Imaging - CT
Medical Imaging - X-ray

CONTACT INFORMATION

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846.