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Stationary scanning x-ray source based on carbon nanotube field emitters GUANG YANG, JIAN ZHANG, Department of Physics and Astronomy, University of North Carolina, Chapel Hill, NC 27599, YUAN CHENG, BO GAO, QI QIU, Xintek, Inc. P.O. Box 13788, 7020 Kit Creek Rd., Research Triangle Park, NC 27709, YUEH LEE, JIANPING LU, OTTO ZHOU, Department of Physics and Astronomy, University of North Carolina, Chapel Hill, NC 27599 — Carbon nanotube is an ideal field emitter thanks to its large aspect ratio and small diameter. Based on its field emission property, we have developed a stationary scanning x-ray source, which can generate a scanning x-ray beam to image an object from multiple projection angles without mechanical motion. The key component of the device is a gated carbon nanotube field emission cathode with an array of electron emitting pixels that are individually addressable via a metal-oxide-semiconductor field effect transistor-based electronic circuit. The characteristics of this x-ray source are measured and its imaging capability is demonstrated. The device can potentially lead to a fast data acquisition rate for laminography and tomosynthesis.

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