

APPLICATION OF A NOVEL ADDRESSABLE-ARRAY X-RAY SOURCE TO MEDICAL IMAGING OF EXTREMETIES

D. Keith Bowen¹, James D. Cameron¹, Conrad Dirckx¹, Paul Edwards¹, Manuel Fohler¹, Isabel A. Gomes¹, Jacob Ludlam¹, Aquila M. Mavalankar¹, Sian Phillips¹, Kate L. Renforth¹, Steven P. Richards¹, Vadim Y. Soloviev¹, Silvia Sottini¹, Alexis Tello Valero¹, Nivedita Yumnam¹ and Stephen G. Wells¹

¹Adaptix Ltd, Oxford University Begbroke Science Park, Centre for Innovation and Enterprise (CIE), Woodstock Road Begbroke, Oxfordshire, OX5 1PF UK.

ABSTRACT

A stationary array of X-ray emitters based on electron field emission from silicon tips has been used to create an orthopaedic medical imaging device for digital tomosynthesis [1]. Recent progress in the development of field emitters, in terms of uniformity and power output, by refining the fabrication process has resulted in an X-ray source performing at comparable X-ray dose level and image quality as standard 2D radiology, but with the addition of depth resolution, usually only available in large, immobile devices such as CT scanners. Depth information increases diagnostic capability, which is otherwise hampered by the overlapping bony structures in conventional 2D images.

The orthopaedic medical imaging device has received US FDA 510(K) clearance in 2023.

References

[1] Bowen, D. Keith, et al., IEEE 36th International Vacuum Nanoelectronics Conference (2023) pp. 192-194.