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The Imaging and Medical Beamline is expanding

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Synchrotron radiation has many advantages, but it is also flawed. And its biggest flaw happens to be its fundamental intrinsic property! The radiation is emitted in the plane of the stored beam and we are stuck with the infamous 'letterbox door' beam profile. At least when not tinkering with focused undulator beams.
In clinical imaging research, this beam shape is a serious disadvantage. In fact, when compared with the field of view of commercial medical imaging devices, it is often the showstopper when engaging with a clinician to discuss medical application of the IMBL.
So how will we image human patients in 2022, as part of our world leading research project in breast CT imaging and cancer detection? Our vertical 'letter box opening' at 135 meter is 3 cm, at 35 keV, with a roll off of 50%. This is far from ideal for imaging the breasts of a patient lying in a prone position on our robotic positioning and scanning stage. Consequently, we have designed and tested a Bragg-Bragg beam expander to be placed downstream of our double-bent-Laue primary monochromator. The net result is an 8 cm vertical beam profile at 135 meter, with minimal roll off, to match the vertical field of view of our new EIGER2 CdTe X 3M clinical detector.
This paper will present the design of our beam expander and the results of our in-air tests. This device will be installed in vacuum in the next machine shutdown.

Level of Expertise

Expert

Presenter Gender

Man

Pronouns

He/Him

Which facility did you use for your research

Australian Synchrotron

Students Only - Are you interested in AINSE student funding

Do you wish to take part in the Student Poster Slam

Condition of submission

Yes

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