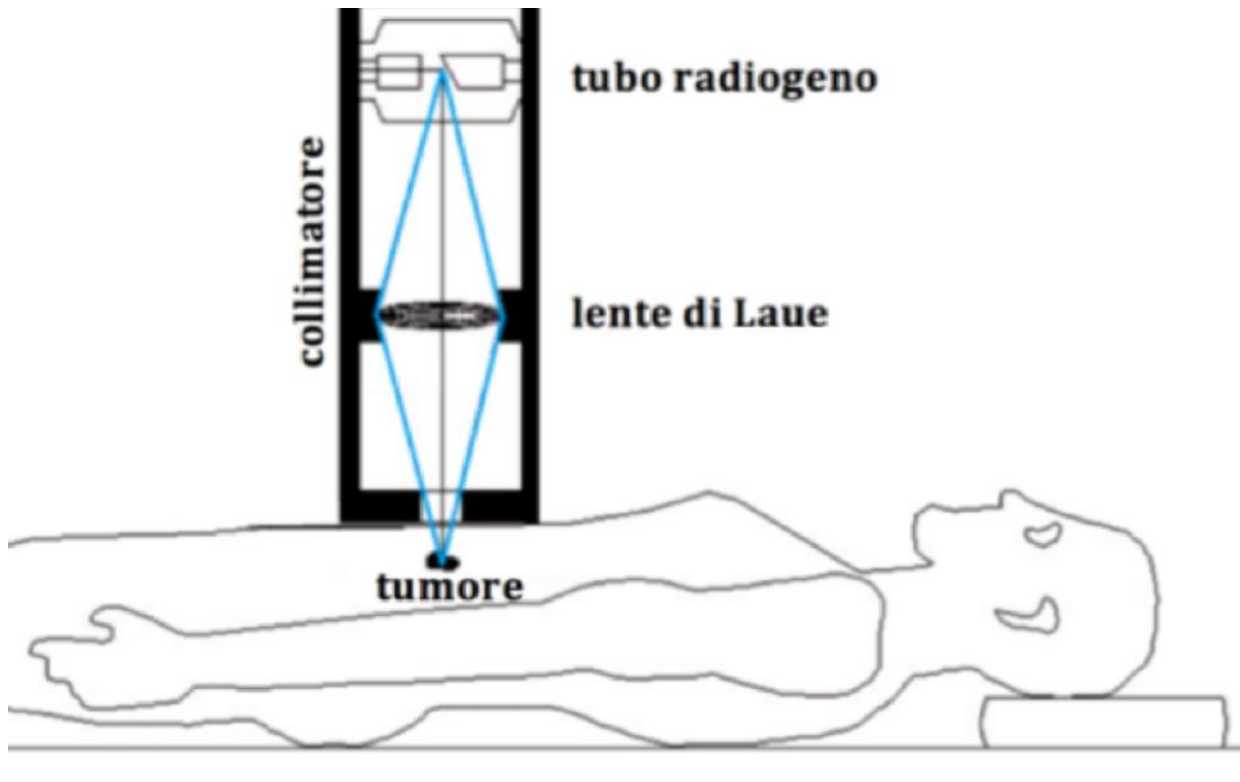


HARD X-RAY CONCENTRATOR FOR RADIOTHERAPY



PRIORITY NUMBER:

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KEYWORDS:

X-rays

Radiotherapy

Laue lens

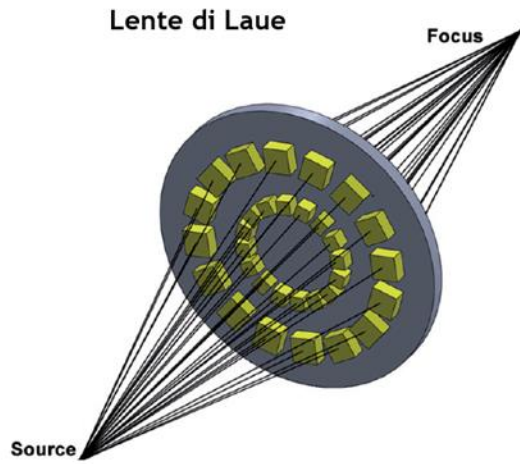
Crystals

Diffraction

The present invention relates to an x-ray concentrator usable in the energy range from 10 up to 1000 keV. One particular use of such a concentrator is its use in combination with an x-ray tube or other source to produce a focused beam for radiotherapy applications. In this way the x-rays beam can be focused more precisely on the tumor volume, sparing at the same time the surrounding healthy tissues.

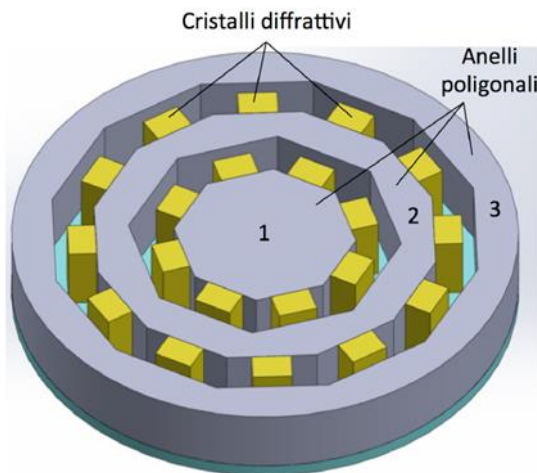


HARD X-RAY CONCENTRATOR FOR RADIOTHERAPY



DESCRIPTION :

The proposed device consists in a Laue lens, i.e. a device based on a set of crystals arranged in concentric rings so as to apply the Bragg's diffraction phenomenon on an x-ray beam passing through (Laue diffraction), in order to concentrate an x-ray beam at the focal point of the lens. The particular design allows both the miniaturization of the diffractive elements and the control, in a practical way, of the alignment of a large number of such crystals. Experimental tests have shown that these features allow on the one hand to overcome the many difficulties encountered in the realization of Laue lenses, on the other hand to be able to compose a multitude of crystals with an alignment such as to be an effective x-ray concentrator for radiotherapy.



ADVANTAGES:

- Better dose distribution in the tumor volume
- Save healthy tissues
- Simpler crystals alignments
- Reduction of the time need to correct the disalignments
- System costs reduction

APPLICATIONS:

- Radiation-therapy
- Small area material characterization