

Compact Multileaf-Collimator with small diameter (P-901)

Keywords

- Multileaf Collimator (MLC) with small diameter
- Medium radiation field size of 10 x 12 cm
- Small and Flexible Linear accelerator
- Radiation diaphragm

Abstract

Currently, Multileaf Collimators (MLC) are established and state of the art in numerous devices for radiotherapy used for cancer treatment. However, the established MLC comprising 80 and more leaves require an enormous space at the level of the leaves together with corresponding drive elements and position measuring/ acquisition. Since space is very limited within the head of linear accelerators the invention proposes a smaller sized Compact MLC.

Technology

The invention describes a known collimator with established MLC design, which comprises a new design regarding the driving elements. The number of leaves shall be in the range of 60 to 80, whereas the field size should cover for instance 10 x 12 cm. It is not intended to equip the MLC with overtravel technology. The MLC leaves are tapered and within the guiding elements bedded for sliding movement. Drive components are arranged perpendicularly to the beam middle axis towards the direction of the beam source. In addition the drive components are coupled to the leaves using appropriate redirection, which can be accomplished for instance, by the following design proposals:

1. Spring-loaded leaves can be moved using wire-similar parts. Thereby the leaves are pressed (S. pos. A in figure 1) or pulled (S. pos. B in figure 1) in the basic position to the radiation center and pulled by means of the wires into the desired position. The monitoring of the leaf position is possible for example with wire rope poten-

tiometers. By means of guide rollers the pulling direction is turned by 90° toward the leaf movement. In this case the upper and lower leaf sides are not geared (figure 1).

2. The redirection is possible also with the fact that the leaves are geared on the upper or lower side and driven by an inserted geared wheel and a drive wheel tied up afterwards. The arrangement of this variant also plans that the inserted gear wheel is only partially geared and swiveled by a (linear) drive unit (figure 2)

3. The direction change is done via use of bowden cables. The drive unit can be a linear actuator, which pushes and pulls the bowden cable fixed at the leaves. Over the detour - made possible by special guiding elements - the attachment of the drive units can be turned e.g. 90° towards the radiation axis. The bowden cable can be reinforced at its two ends with a thin-walled pipe or strengthened with a plunger, guided in a suitable guiding part (figure 3).

Development Stage

Currently the proposal of the technical solutions exist and the evaluation of the most efficient design (see 3 figures) is in evaluation and a prototype of the invention is intended to be completed in 2010.

Applications and Commercial Opportunity

MLC for smaller and flexible linac accelerator in radiotherapy for cancer treatment.

