

# Parallel robot for brachytherapy with two kinematic chains of CYL-U type, for the platform (needle) guidance

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## **Description:**

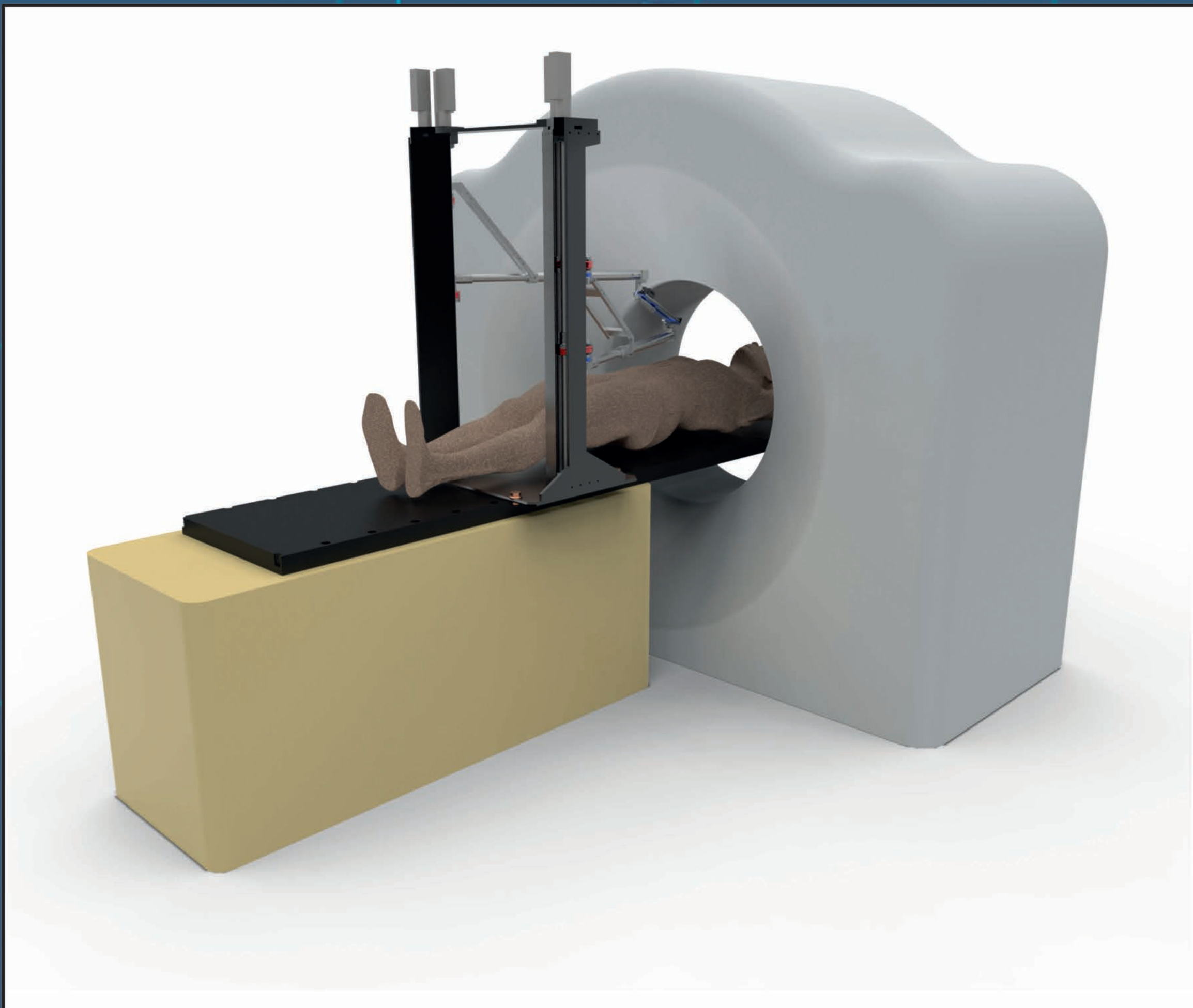
The patent presents a parallel robot with five degrees of freedom and two CYL-U type kinematic chains for the platform guidance optimized for the treatment of inoperable cancers through brachytherapy.

Brachytherapy, or the local, focused treatment of cancer through internal radiation involves the placement of miniaturised radioactive seeds inside the tumour through tiny catheters. As the radiation dosage is high and decreases abruptly from the source, the positioning accuracy is critical to ensure optimal treatment which destroys the tumours without affecting the healthy surrounding tissues.

The solution enables the placement of the brachytherapy needles in any part of the body, with real time CT control, the robot having a light and robust structure, allowing high orientation angles for the brachytherapy needle, the parallel architecture ensuring high precision and good dynamic behaviour. In order to increase the needle positioning accuracy the robot executes the needle placement in two separate stages:

1. The needle is positioned and aligned along the desired trajectory with the needle tip above the insertion point into the patient body.
2. The needle is driven along a linear trajectory from the insertion to the target point (inside the tumour) using force feedback to avoid needle deflection.

**No. Patent or patent application: A/10006/2013**



## **Applicability:**

The patent presents an innovative parallel robot for the minimally invasive treatment of cancer through brachytherapy. The applicability domain of the robot can be extended to any medical procedure that requires the placement of rigid needles inside the human body (e.g. tissue biopsy, fluids extraction, etc.)