The Radiance 330® -- Proton Therapy System Overview

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Introduction

The Radiance 330® is a U. S. FDA 510(k) cleared, proton therapy system, based on compact synchrotron technology, manufactured by ProTom International Holding Corporation. The Radiance 330 is the first proton therapy system specifically purpose-designed and purpose-built for proton therapy.

The machine is compact and modular, consisting of 6 subsystems: Beam Production Subsystem, Beam Transport Subsystem, Beam Delivery Subsystem, Gantry Subsystem, Patient Position Subsystem, and Controls Subsystem.

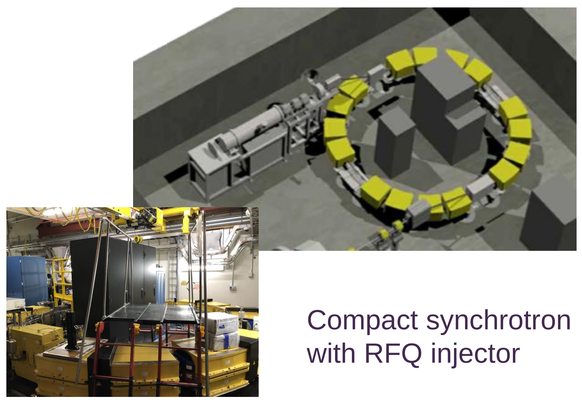
Key features include:

- **Compact and modular design**
- **Pencil Beam Scanning**
- **Treatment beam: 70 MeV to 250 MeV**
- **Imaging beam: up to 330 MeV**
- **Low radiation; less shielding needed**
- **Efficient and economical**

Future capabilities include proton radiography and proton tomography.

Beam Production

Beam production is achieved with a Radio frequency quadrupole (RFQ) injecting into a compact (~4.1 m dia.) synchrotron.

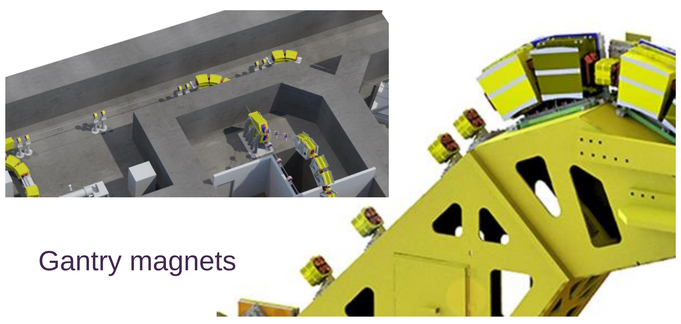


Compact synchrotron with RFQ injector

Beam Transport

Beam transport is achieved with the repeated use of identical dipole and quadrupole optical elements aiding in modularity and layout flexibility.

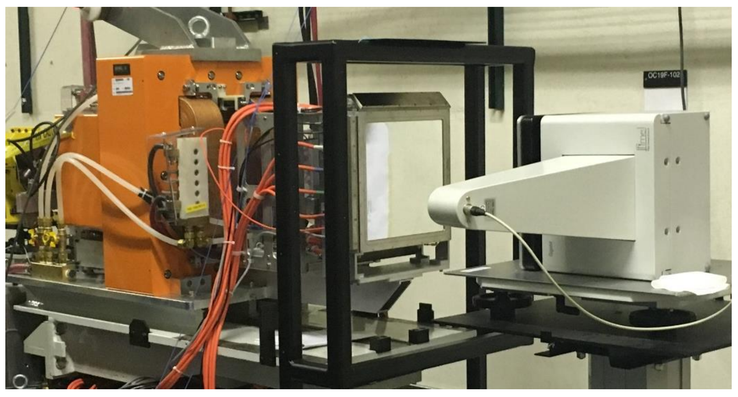
Transport line and switchyard



Gantry magnets

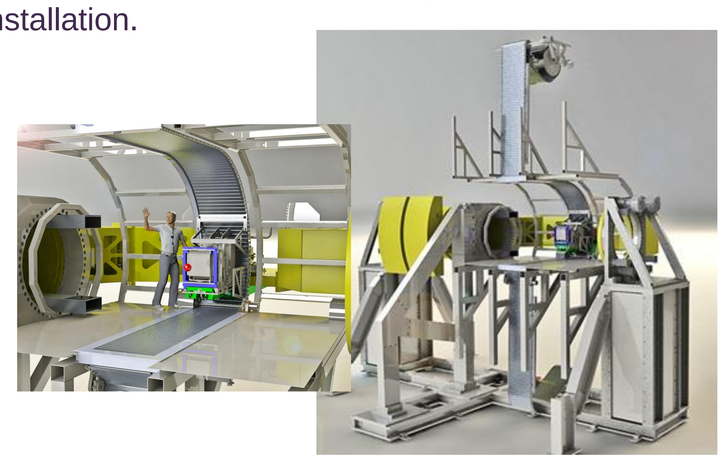
Beam Delivery

Pencil beam is delivered and scanned (Fidelity™ Beam Scanning) for optimal dose precision, accuracy and repeatability



Gantry

Free Standing Gantry, constructed of small steel components for ease of shipping and rapid installation.

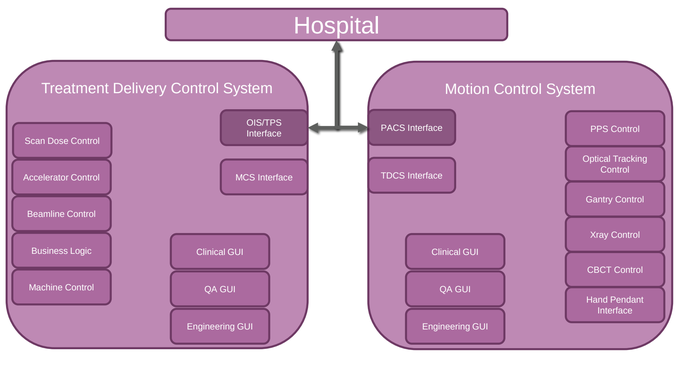


PPS

Patient positioning subsystem with 6 degree motion. Independent 510(k) clearance.

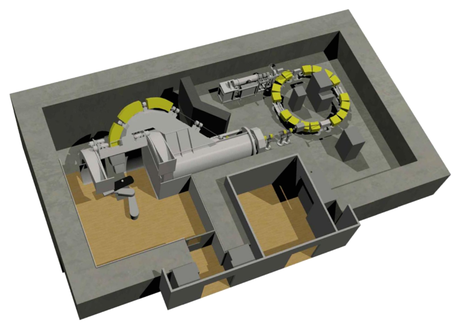
Controls

Software modularity - maintenance of common codebase across sites while allowing customer configurations and specials.



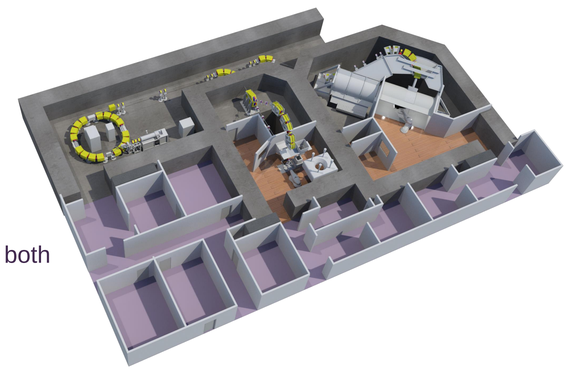
Configurable

Many different configurations available. Modular/flexible design that includes interchangeable sub-systems; can be installed in purpose-built or existing facilities. Single or multi treatment room facilities.



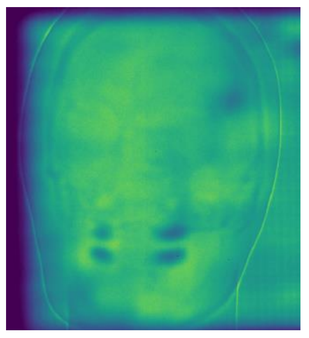
Single room

Multi-room: fixed beamline, gantry or both



Proton Imaging

330 MeV demonstrated: 59 cm WET; all anatomical sites accessible. Imaging, radiography and tomography is a future capability. Some initial results from imaging a head phantom.



Also see PTC57-0195 – Estimation of phantom RSP using an x-ray flat panel detector and a scanned proton beam up to 330 MeV

References

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