

**Az SZTE Kutatóegyetemi Kiválósági Központ tudásbázisának
kiszélesítése és hosszú távú szakmai fenntarthatóságának megalapozása
a kiváló tudományos utánpótlás biztosításával”**



Eötvös Loránd Kollégium
Eötvös Esték
2013. 02. 21.

**EXREM LIGHT INTENSITIES (ELI) és a
biológiai realitás**
Dr. Bari Ferenc



TÁMOP-4.2.2/B-10/1-2010-0012 projekt



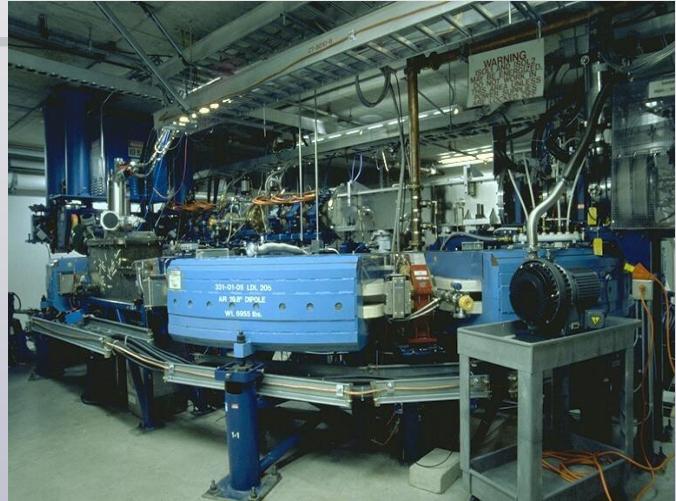


ÁKA KONZORCIUM

LLUMC Proton Treatment Center



Hospital-based facility



40-250 MeV Synchrotron



Gantry beam line



Fixed beam line

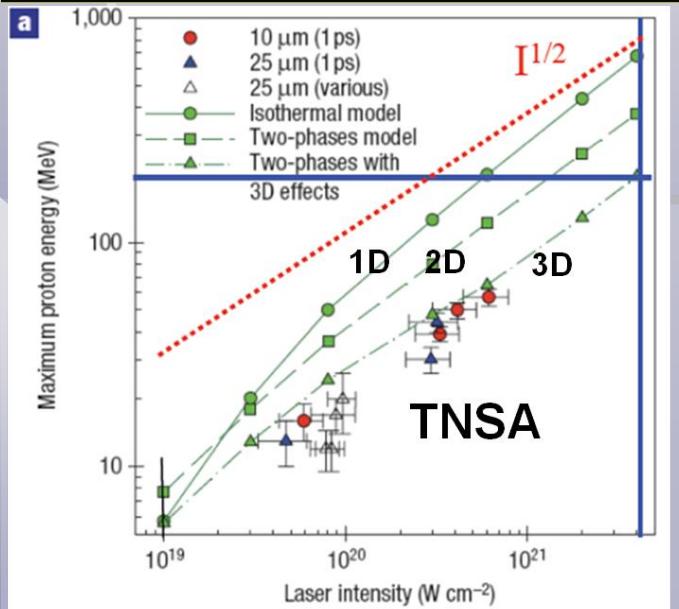
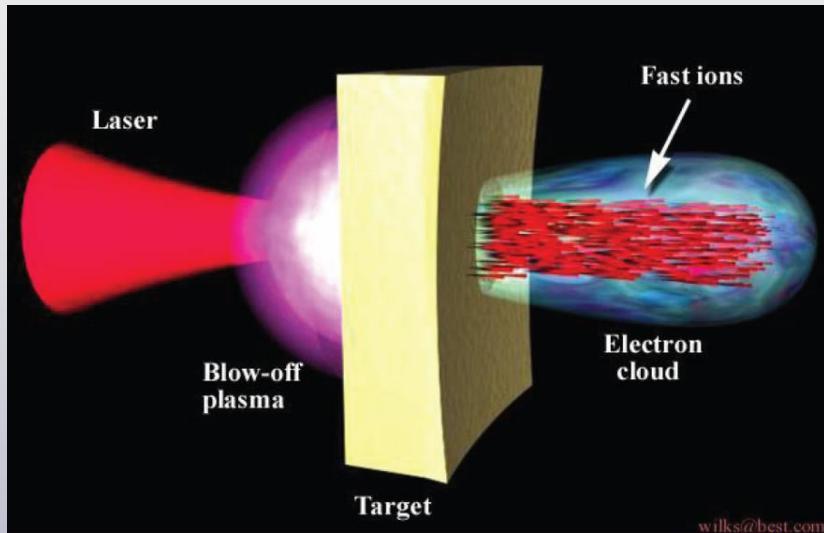
2. X-Ray Machines



A modern system for treating a patient with x-rays produced by a high energy electron beam. The system, built by Varian, shows the very precise controls for positioning of a patient. The whole device is mounted on a gantry. As the gantry is rotated, so is the accelerator and the resulting x-rays, so that the radiation can be delivered to the tumor from all directions.

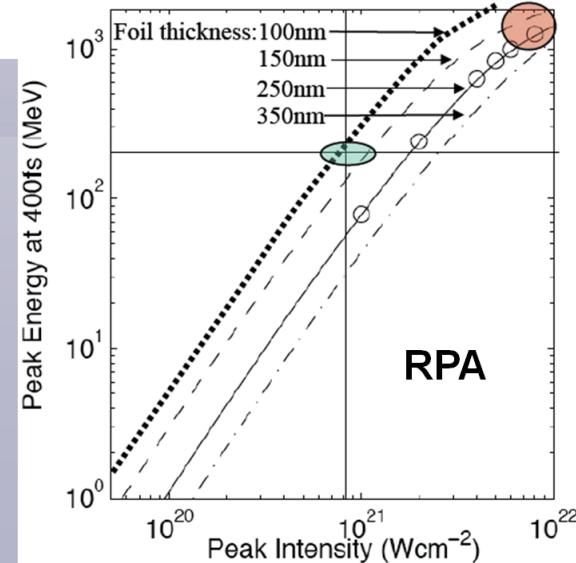
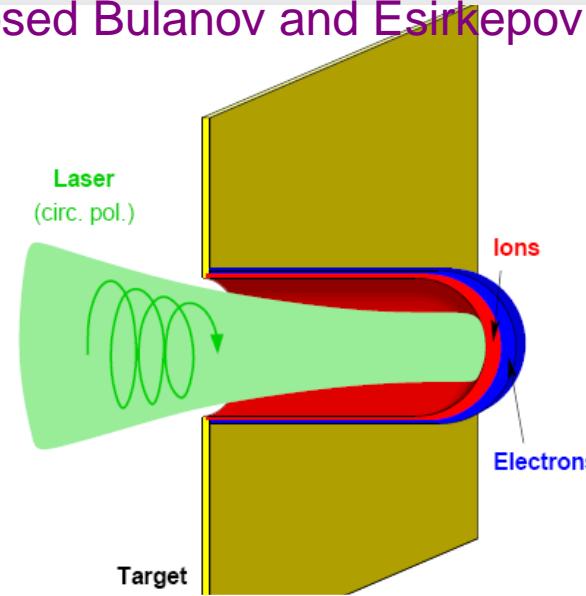
High peak power laser can derive the energetic protons

Target Normal Sheath Acceleration



Robson, et al., Nature Physics (2006)

Radiation Pressure (Coherent)Acceleration proposed Bulanov and Esirkepov et al.



Zepf., AAC08

TNSA

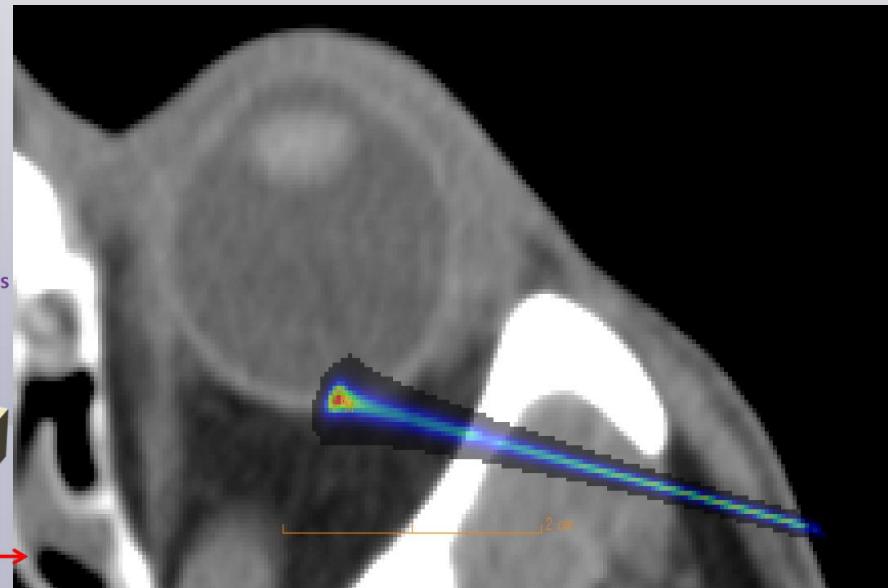
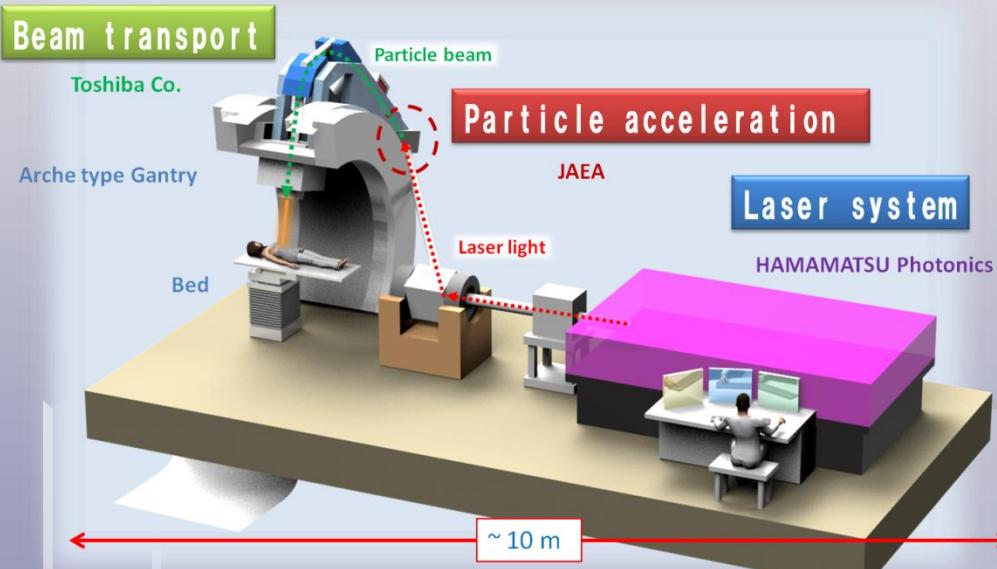
Target tumors for laser driven 80MeV proton

Shallow tumors which exist within 5cm below the skin

Laser driven cancer therapy machine

Elaborate treatment

Simulation for laser driven proton beam



Particle energy : 80 MeV/nucleon, which corresponds to reach 5 cm from the body surface.

Ken Sutherland

69 MeV

Japan Atomic Energy Agency

By Prof. Murakami (HIBMC)