Säteilyntuotto

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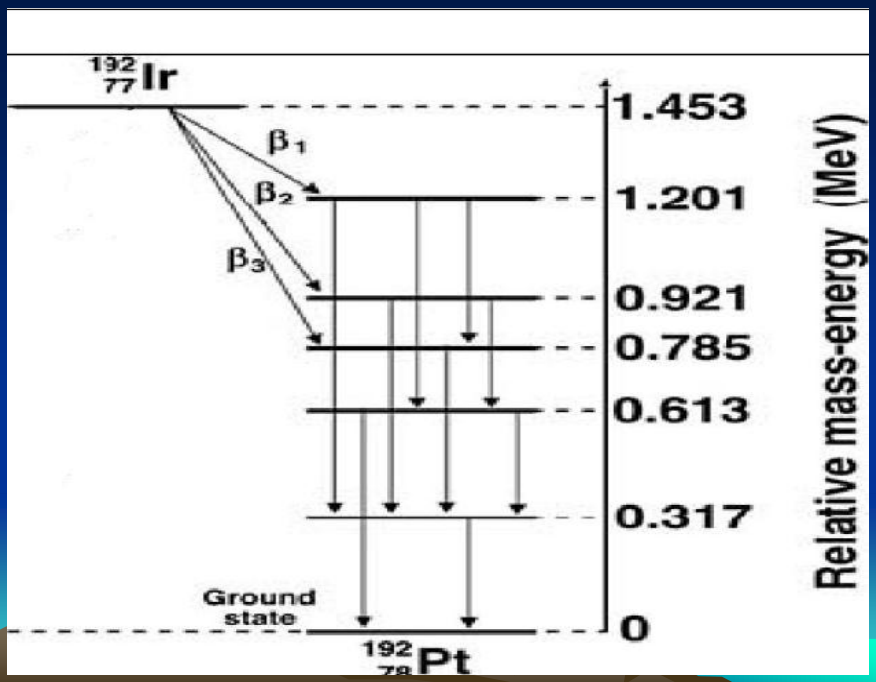
KYS, Syöpäkeskus

Sisäinen sädehoito:
radioaktiiviset isotoopit esim. 125-I ja 192- Ir
jyvät, langat
jälkilatauslaitteet

Ulkoinen sädehoito:
Co ja Cs-kanuunat
Ydin reaktori, neutronivuo ja boorikaappaushoito
hiukkaskiihdyttimet:
betatron
protonikiihdytin
neutronikiihdytin
elektronikiihdytin

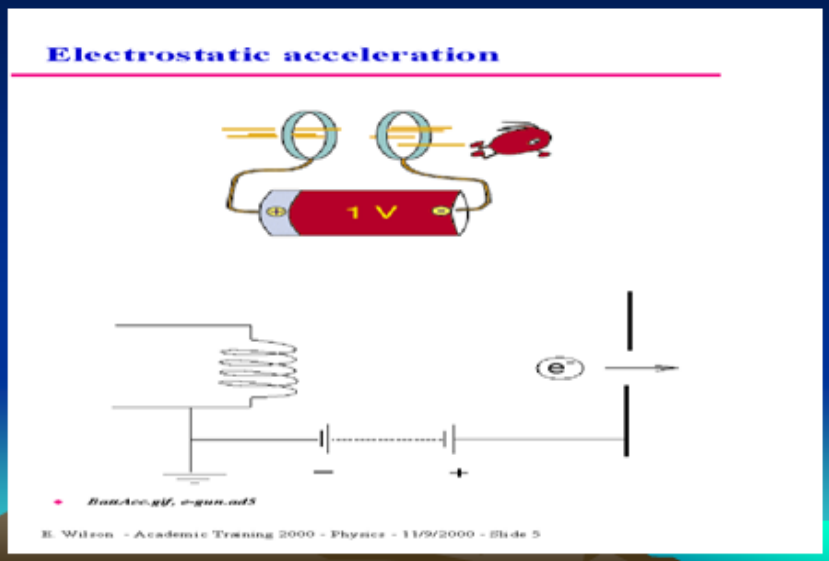


Summary

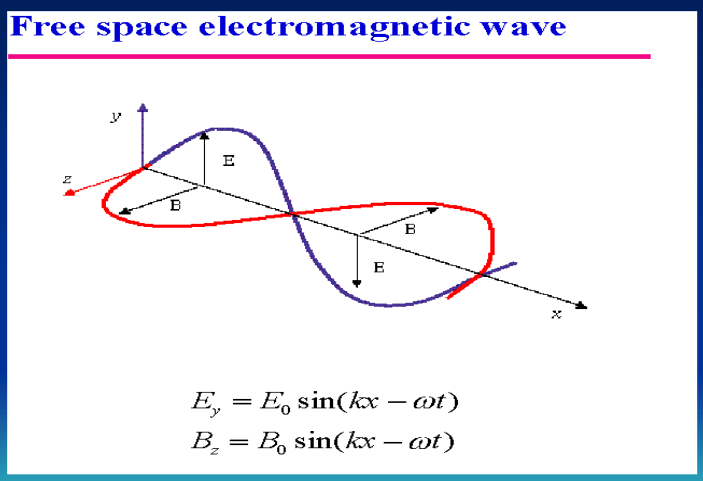
Radionuclide	Half-life	Principal or mean energies from encapsulated sources, MeV*		
		Photon	Beta	Neutron
Radium-226	1622 y	0.830		
Cesium-137	30 y	0.662		
Iridium-192	74 d	0.380		
Gold-190	2.7 d	0.412		
Iodine-125	60 d	0.028		
Palladium-103	17 d	0.021		
Strontium-90	29 y		0.50	
Ytterbium-90	64 h		2.27	
Phosphorus-32	14 d		1.71	
Californium-252	2.65 y			2.15

* These are nominal values assuming typical encapsulation for sources.

Elektronin kiihdytys sähkökentässä

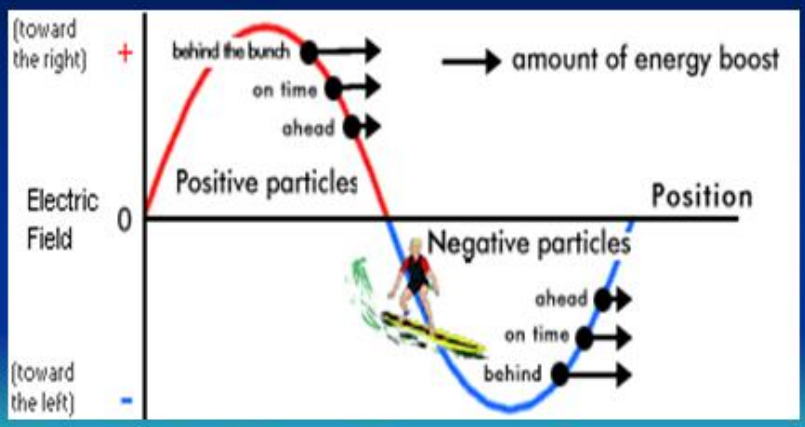


Elektronin kiihdytys sähkömagneettikentässä

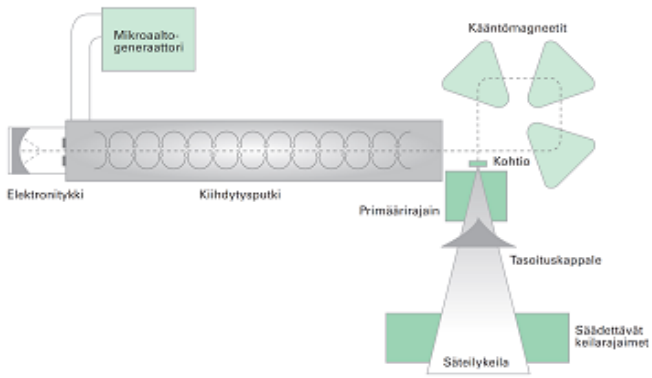


$$E_y = E_0 \sin(kx - \omega t)$$
$$B_z = B_0 \sin(kx - \omega t)$$

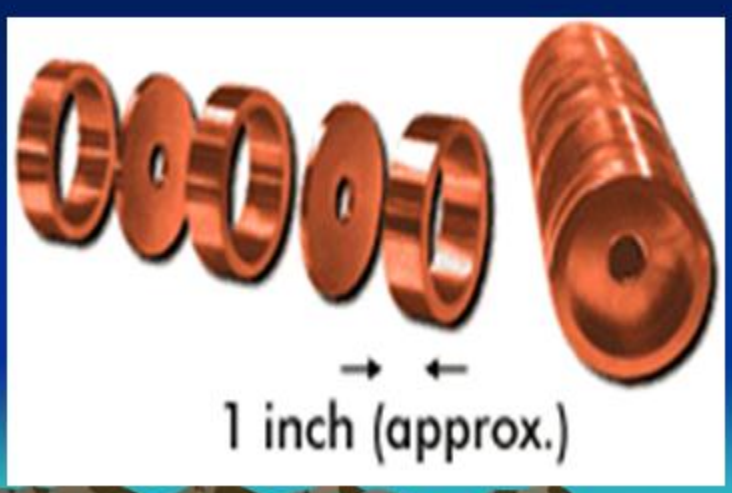
Elektronin kiihdytys sähkömagneettikentässä



Säteilyntuotto hiukkaskiihdyttimellä



Värähtelykammio ja kiihdytysputki



Tykki, niputtaja ja kiihdytysputki

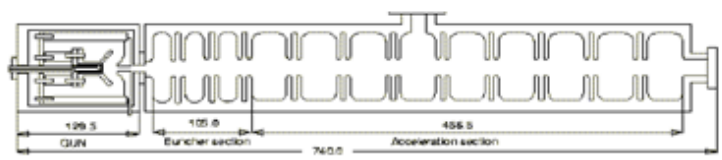
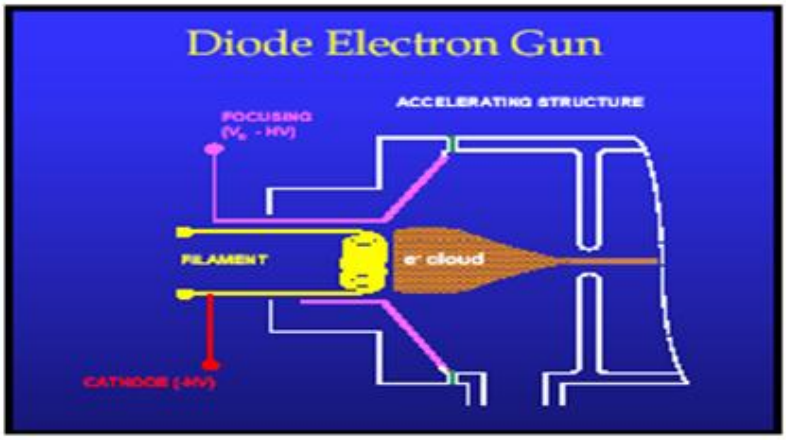
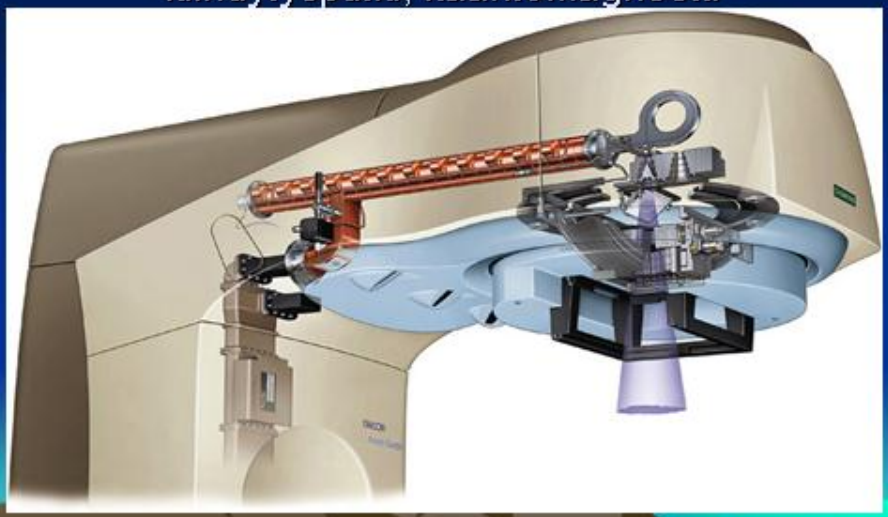


Figure 4: Schematic of SW linac, unit in millimeter.

Elektronitykki



rf-tehon syöttö, elektronien injektio, kiihdytysputki, kääntömagneetti



Magnetron

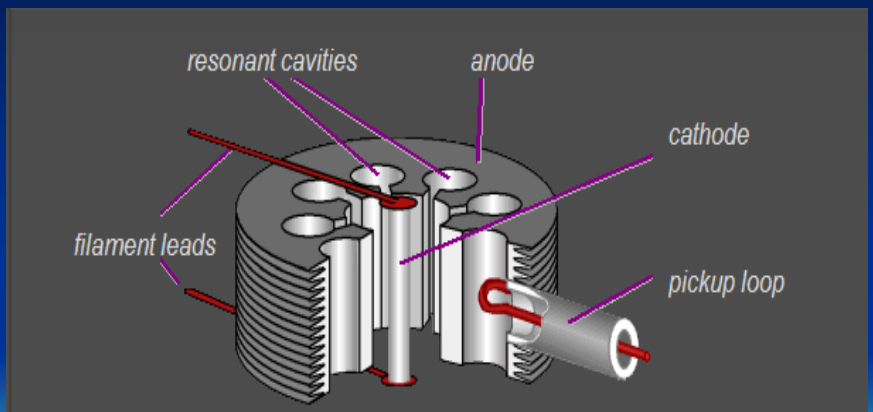
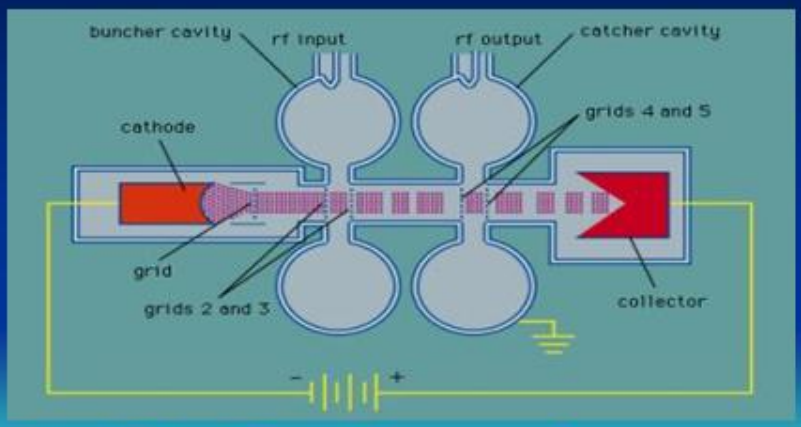
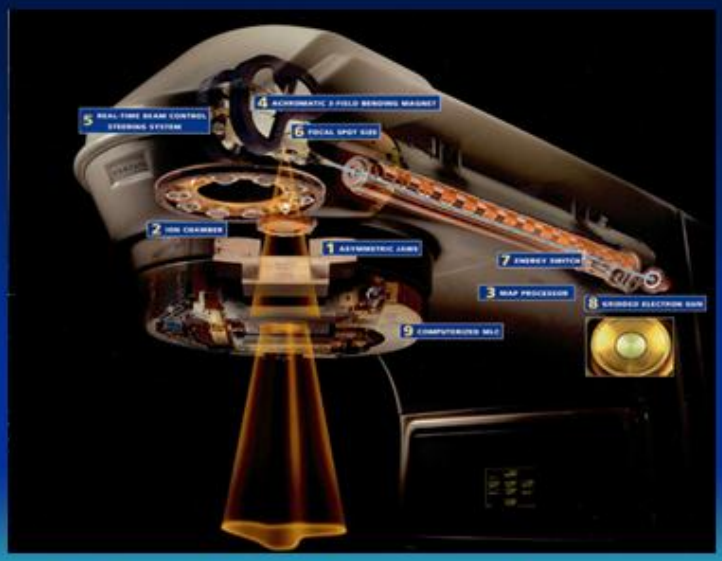


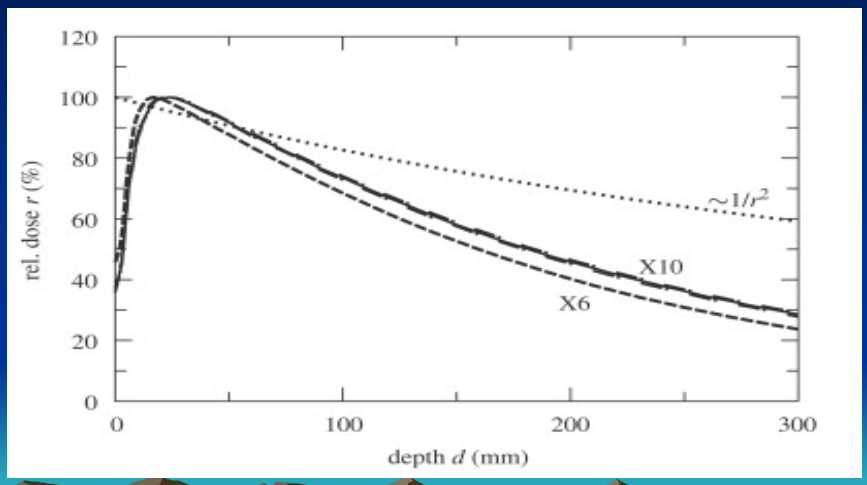
Figure 2: Cutaway view of a magnetron

RF-teholähde: klystroni





Syväannoskäyrä fotonit



Syväannoskäyrä elektronit

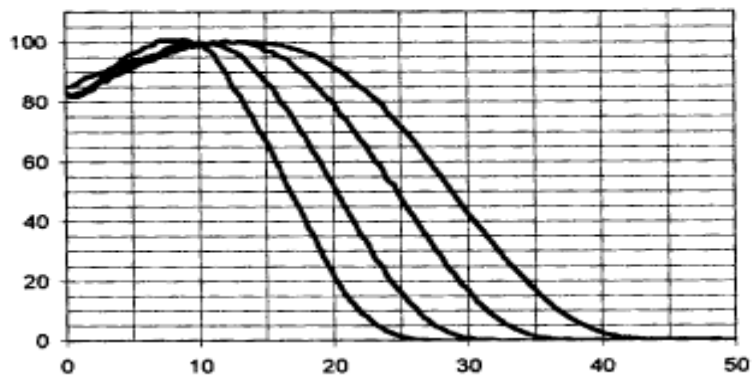
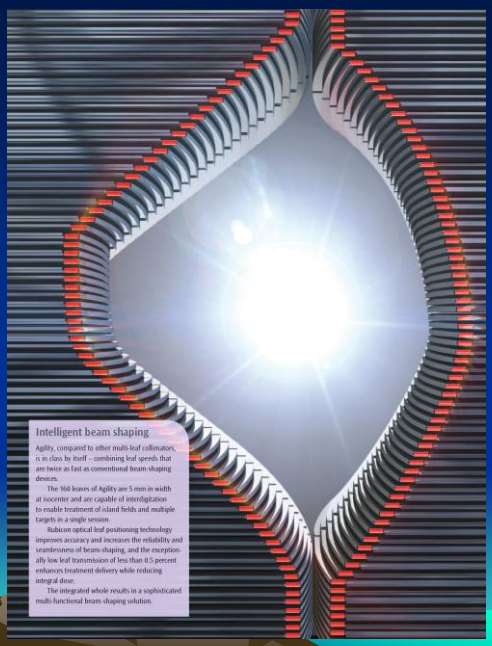


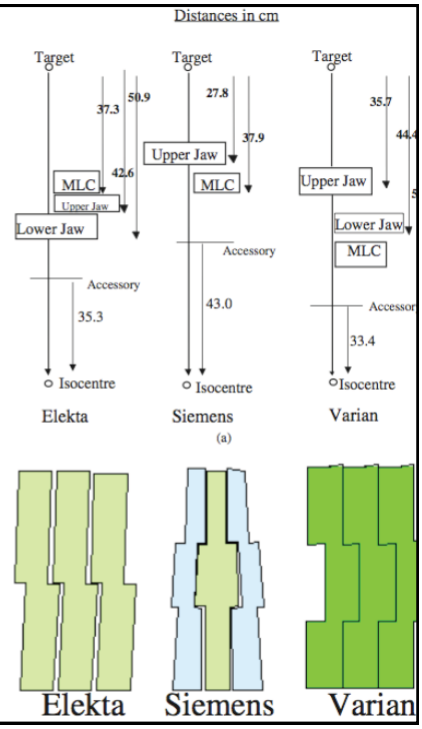
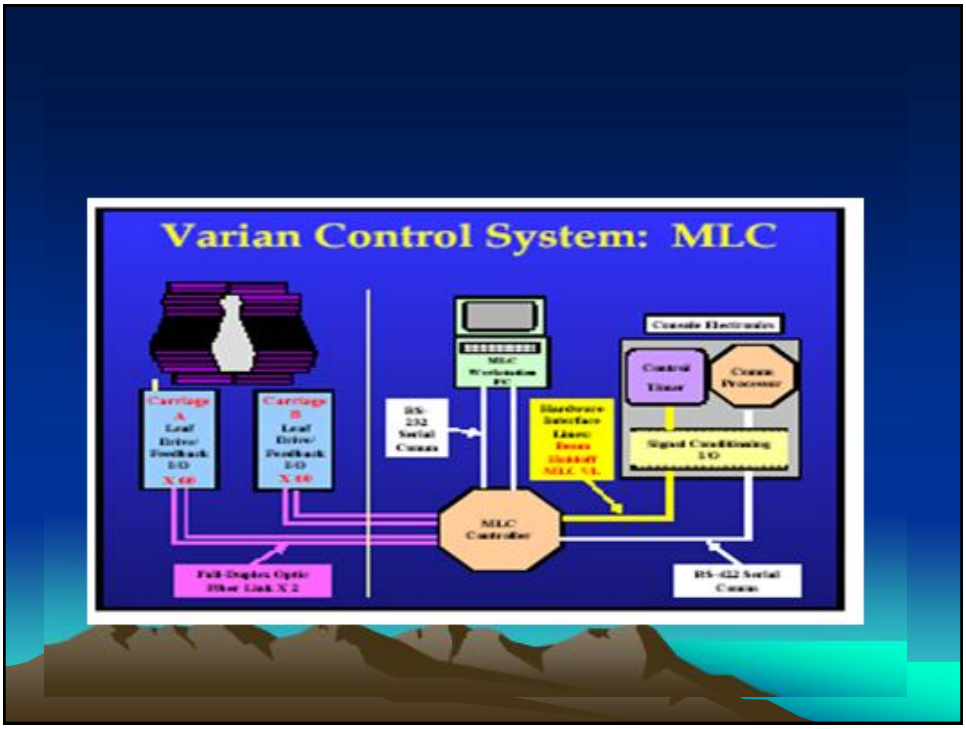
Fig. 4. Depth dose curves in water for *Novac 7*. From links to right, nominal energies of 3, 5, 7 and 9 MeV. In abscissa: depth in mm; in ordinate: percentage depth dose, normalised to the maximum.

MLC



dosimetric comparison of
arious multileaf collimators

uq et. al.
hys. Med. Biol. 47, 2002.

Evaluation of the MLC
performance for

- Penumbra
- Leakage
- Tongue and groove effect