Bragg peak

The Bragg peak is the maximum of the Bragg curve, which records the energy loss of linearized ionizing radiation as it passes through the material. It depends on the type of radiation, the initial energy of the particles and the material through which it passes.

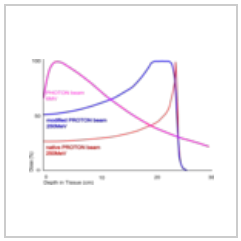
The Bragg curve is based on the relationship: $S(E) = -dE/dx$, where dE is the change in energy and dx means the change in path.

The medium range of the particle (lying roughly at the same depth as the Bragg peak) is calculated by integrating the reciprocal over the energy (E0 means the initial kinetic energy of the particle):

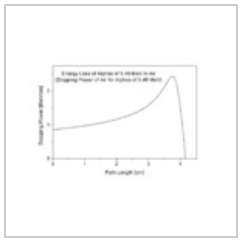
$$\Delta x = \int_0^{E_0} \frac{1}{S(E)}\, dE.$$

Examples

The Bragg curve for the proton stream has a specific course that is used in radiotherapy (proton therapy). The radiation transmits most of its energy in a relatively small section only at the end of the range of the particles, which are all absorbed, so the radiation does not continue and does not affect the material behind it.
Hadron or ion radiation has a similar course. They differ in the steepness of the onset of the Bragg peak, the amount of "residual" radiation behind it, and the depth of the range. Some are also expected to be used more widely in radiotherapy.



Proton radiation



Bragg Curve for Alphas in Air

Related articles

- Absorption, Beer–Lambert law

External links

- Radiotheraphy on wikipedia, Czech version

Resources

- NAVRÁTIL, Leoš – ROSINA, Jozef, et al. *Medicínská biofyzika.* 1 (dotisk 2013) edition. Praha : Grada Publishing, 2005. 524 pp. ISBN 978-80-247-1152-2.
- ULLMANN, Vojtěch. *Hadronová terapie* [online]. [cit. 2014-12-14]. <http://astronuklfyzika.cz/JadRadMetody.htm#HadronTerapie>.
- ULLMANN, Vojtěch. *Hadronová terapie* [online]. [cit. 2014-12-14]. <http://astronuklfyzika.cz/JadRadFyzika6.htm#InterakceAlfaBeta>.