(16.4) The TD reaction is used to produce 14 MeV neutrons, which are considered to be emitted isotropically from the target. What is the fast neutron "flux" at 5 cm from the target when the ion current is 0.2 mA and the acceleration voltage is 300 kV? Use Figure 16.11.

From Figure 16.11 for TD at 300 keV the yield is estimated to be $1.2*10^8$ n s^{-1} mA^{-1}.

$yield := 1.2 \cdot 10^8 \cdot sec^{-1} \cdot \mu A^{-1}$ $current := 0.2 \cdot mA$ $N_{tot} := yield \cdot current$ $r := 5 \cdot cm$

Assume that all neutrons are emitted isotropically. Hence the total number of neutrons must pass through the surface of a sphere with 5 cm radius. The number of neutron per unit area is the flux.

$$\phi := \frac{N_{tot}}{4 \cdot \pi \cdot r^2} \qquad \phi = 7.639 \cdot 10^{11} \cdot m^{-2} \cdot sec^{-1} \quad \text{or} \quad \phi = 7.639 \cdot 10^{7} \cdot cm^{-2} \cdot sec^{-1}$$