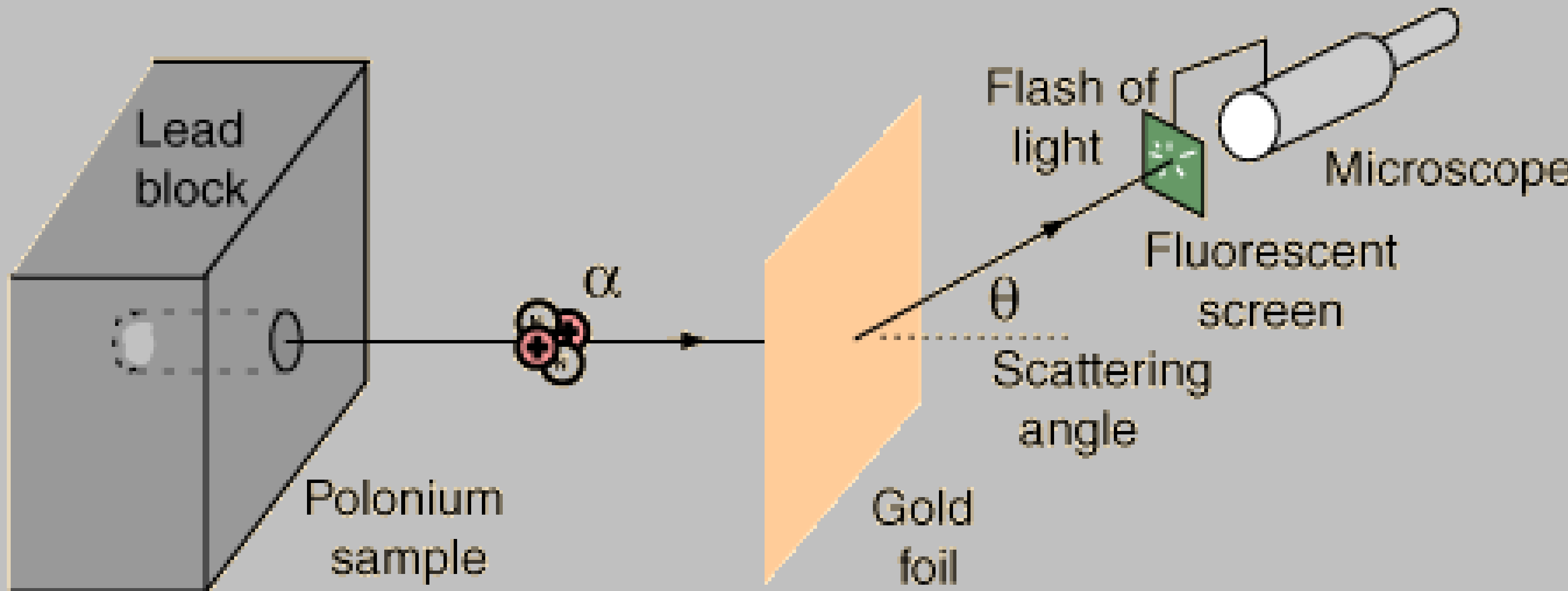
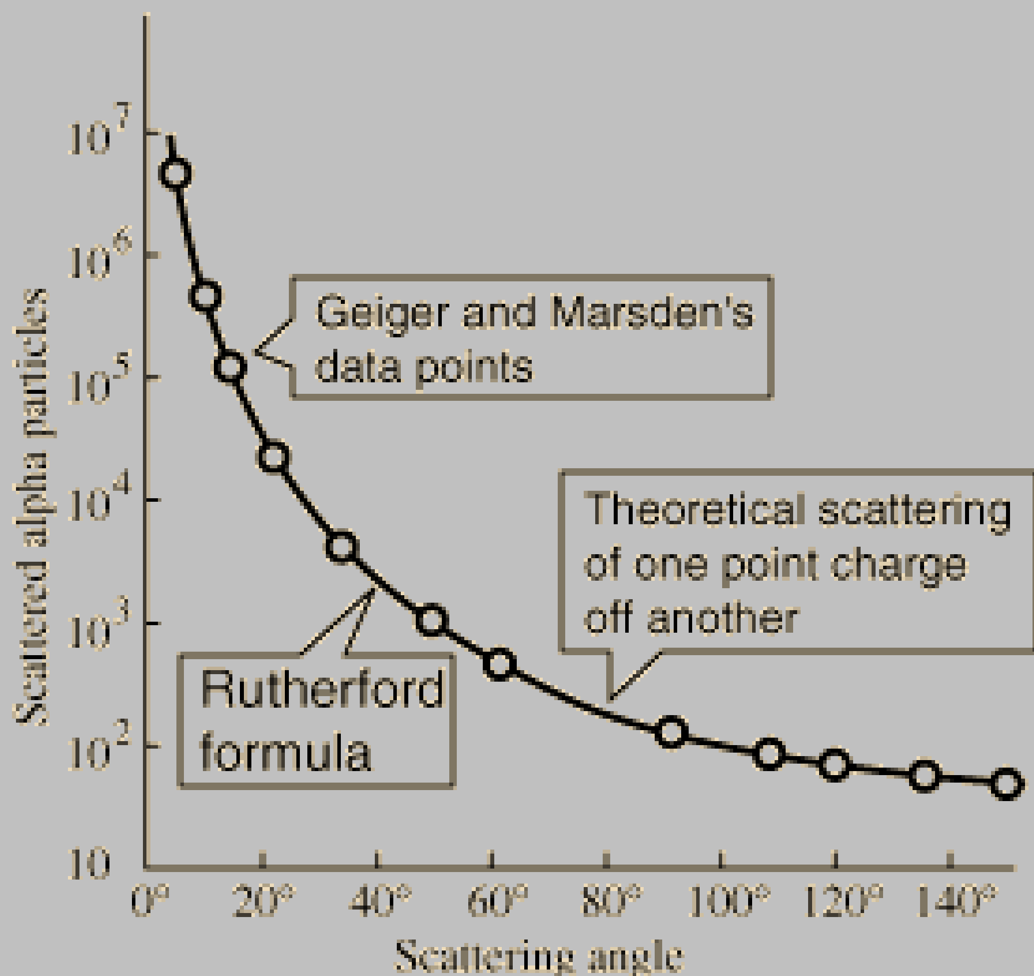
Rutherfordův rozptyl: α částice (7.7 MeV) na Au
Geiger, Marsden + Rutherfordova interpretace, 1909-1913

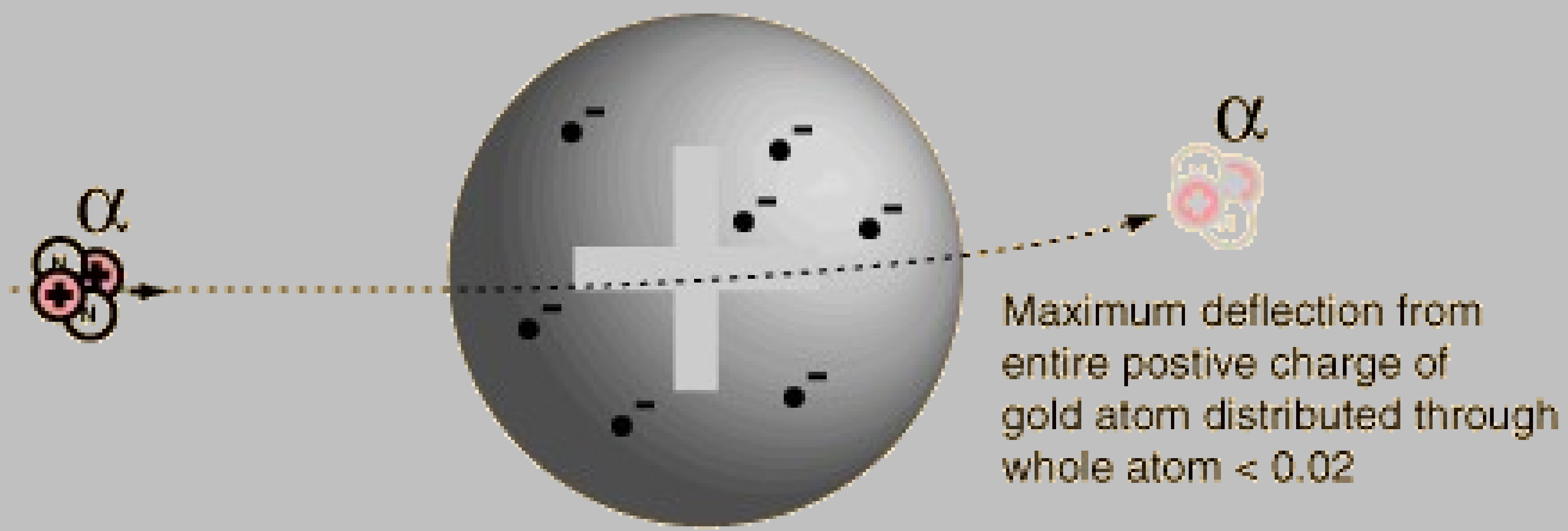


Rutherfordův rozptyl: α částice (7.7 MeV) na Au:
zhruba rozptyl na „bodovém“ náboji



Rutherfordův rozptyl s Thomsonovým modelem atomu („hrozinkový puding): zanedbatelný rozptyl zpět

Rutherford's remark:
"It was quite the most incredible event that ever happened to me in my life. It was almost as incredible as if you had fired a 15-inch shell at a piece of tissue paper and it came back and hit you."

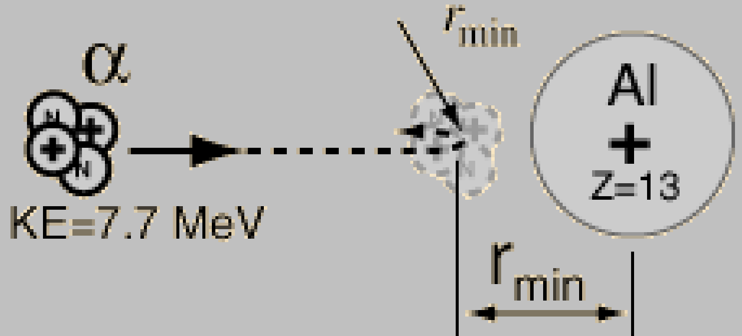


Rutherfordův rozptyl s max. energií 7.7 MeV na lehkých jádrech (Al): odhad rozměrů jádra

A famous remark by Rutherford to his graduate students
"There is no money for apparatus -. we shall have to use our heads!"

(dnešní údaj: 3.6 fm)

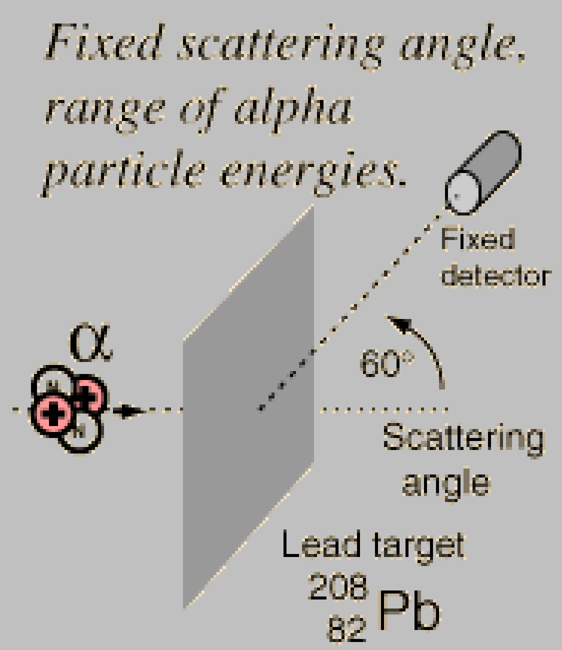
$$PE = \frac{ke^2(2)(13)}{r_{min}}$$

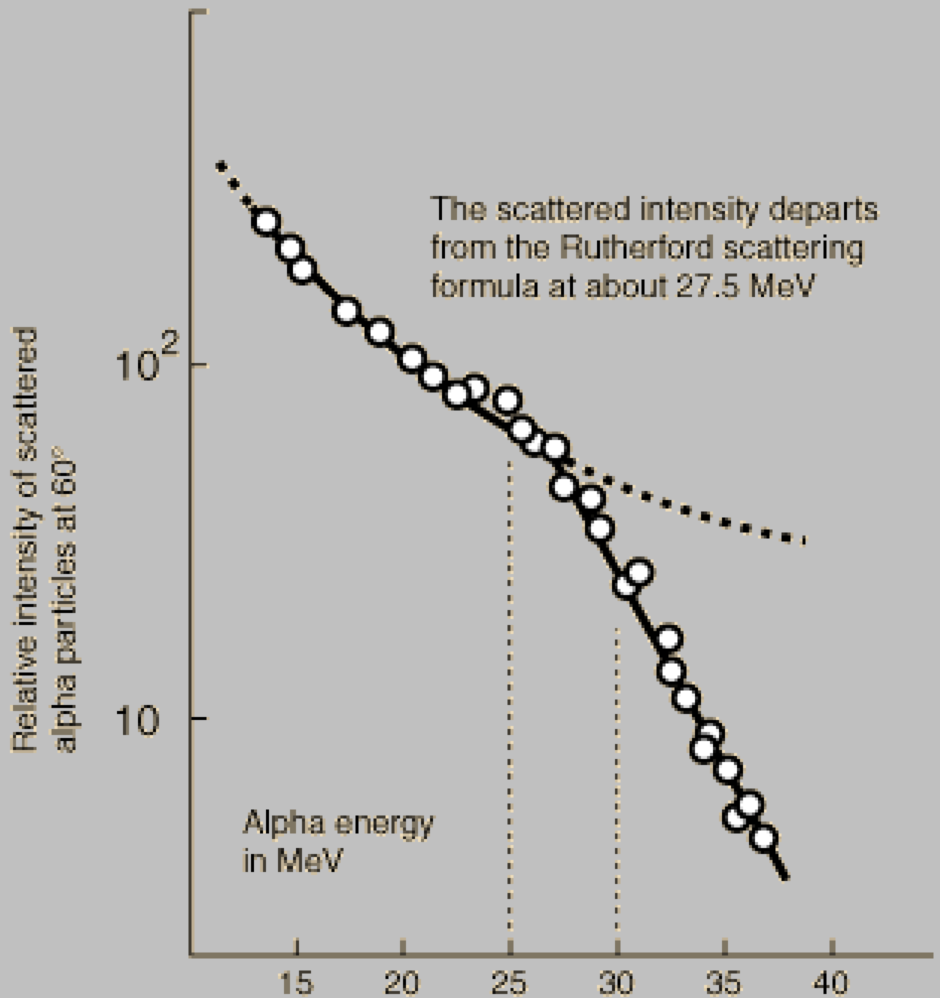


$$r_{min} = \frac{ke^2 Z_1 Z_2}{KE} = \frac{(1.44\,MeV \bullet fm)(2)(13)}{7.7\,MeV}$$

$$r_{min} = 4.86 \quad fermi = 4.86x10^{-15}\,m$$

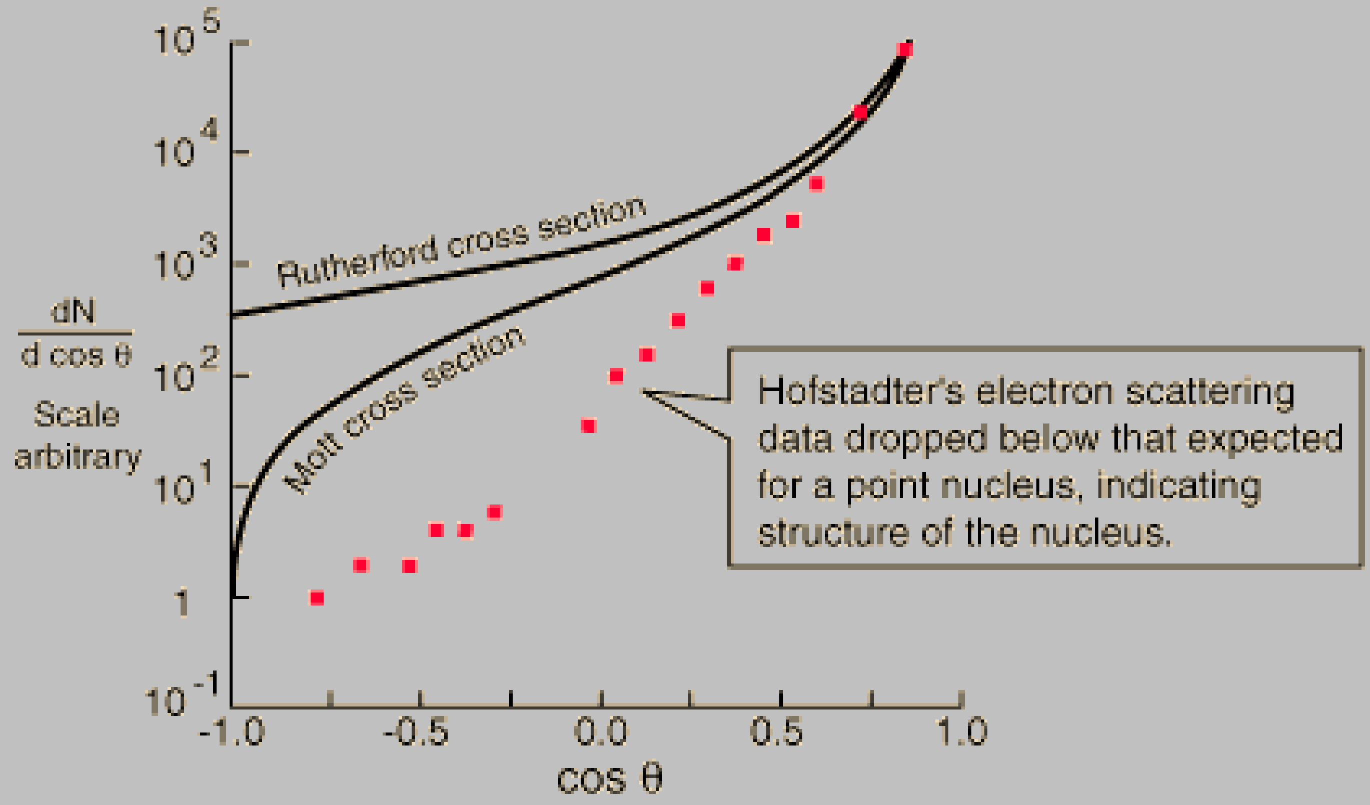
Rutherfordův rozptyl s velkou energií (Eisberg&Porter, Brookhaven)



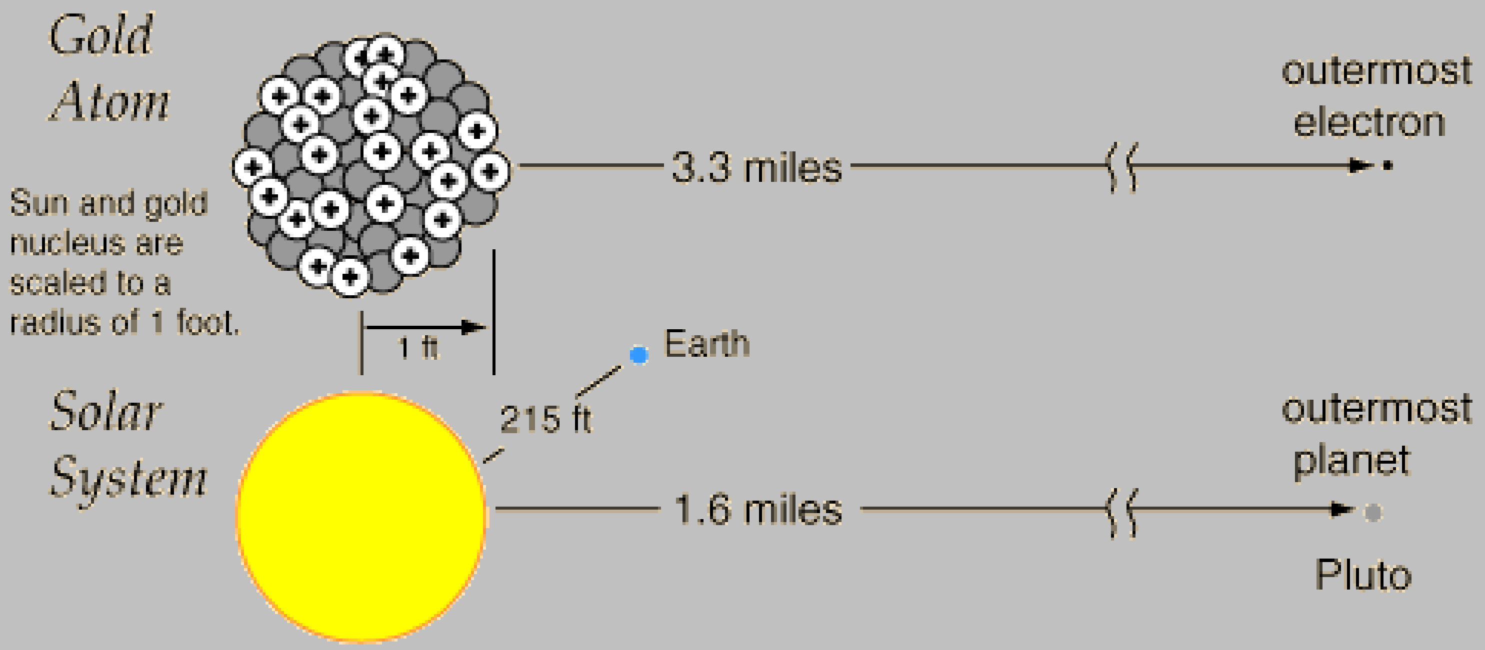


Rozptyl vysokoenergetických elektronů – struktura jádra

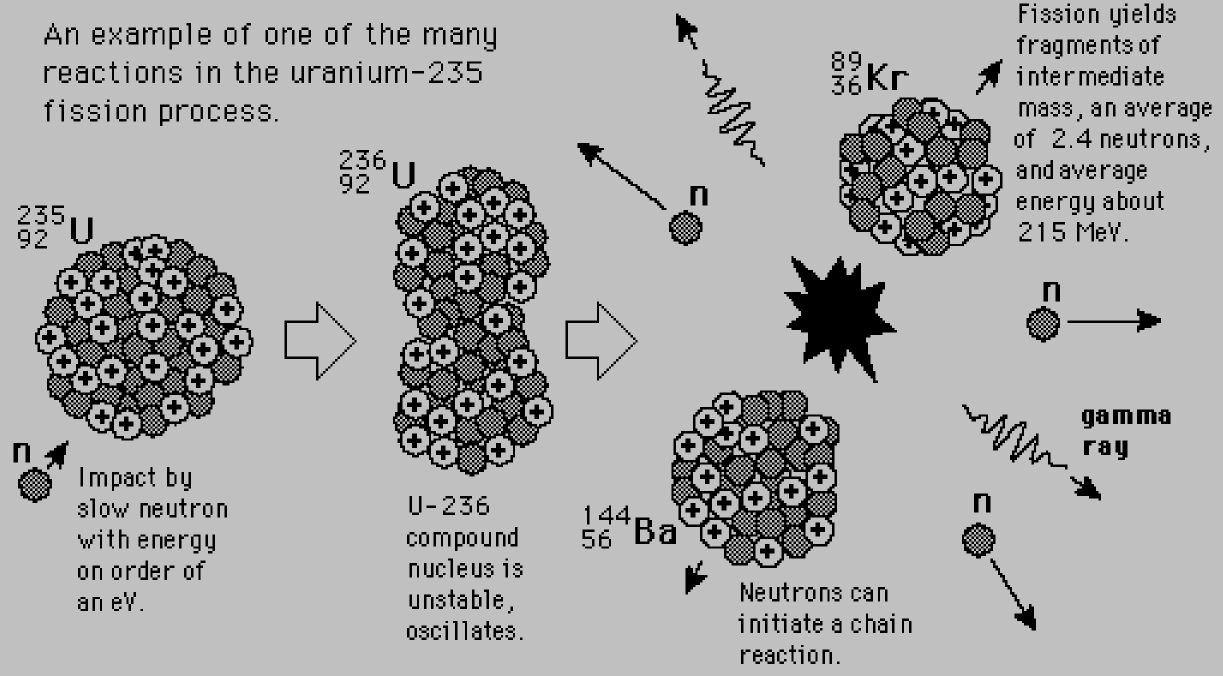
125-150 MeV, Stanford Linear Accelerator



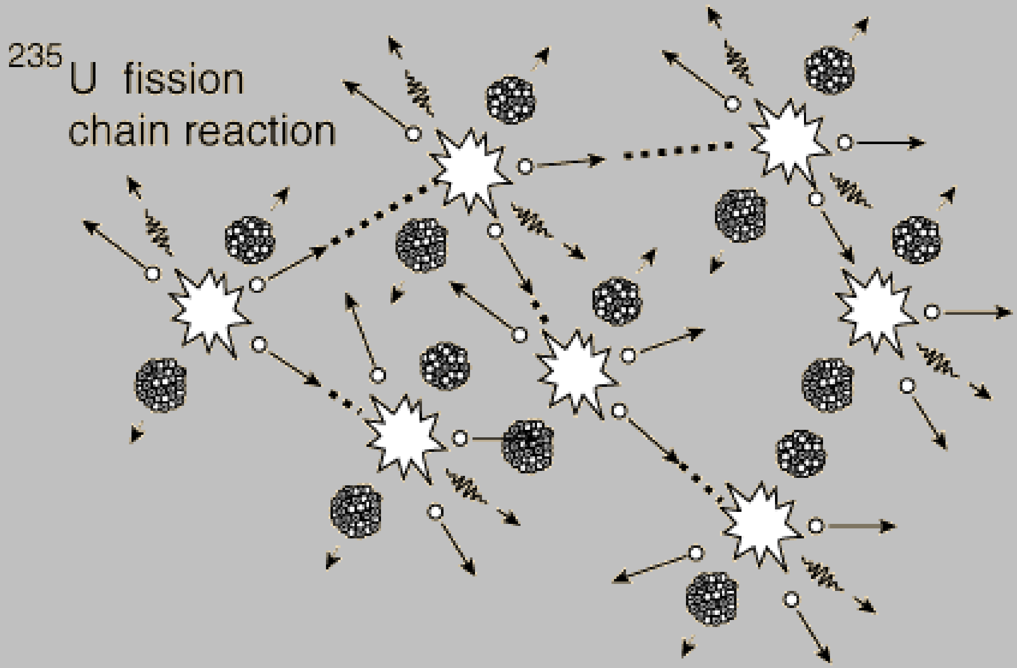
Relativní rozměry, atom a sluneční soustava



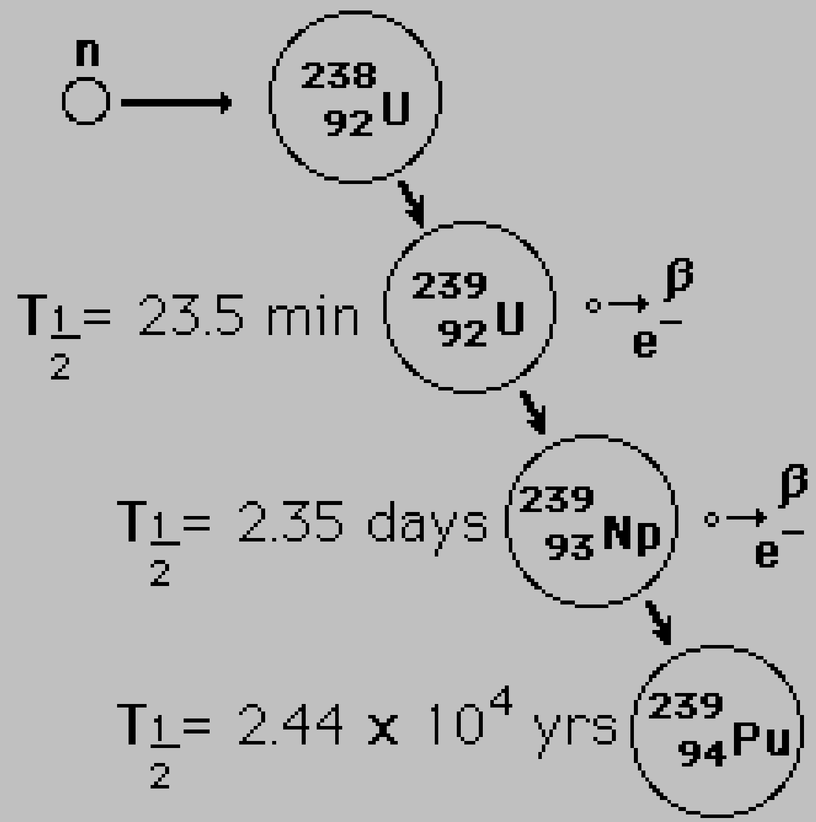
Štěpení ^{235}U po nárazu pomalého neutronu



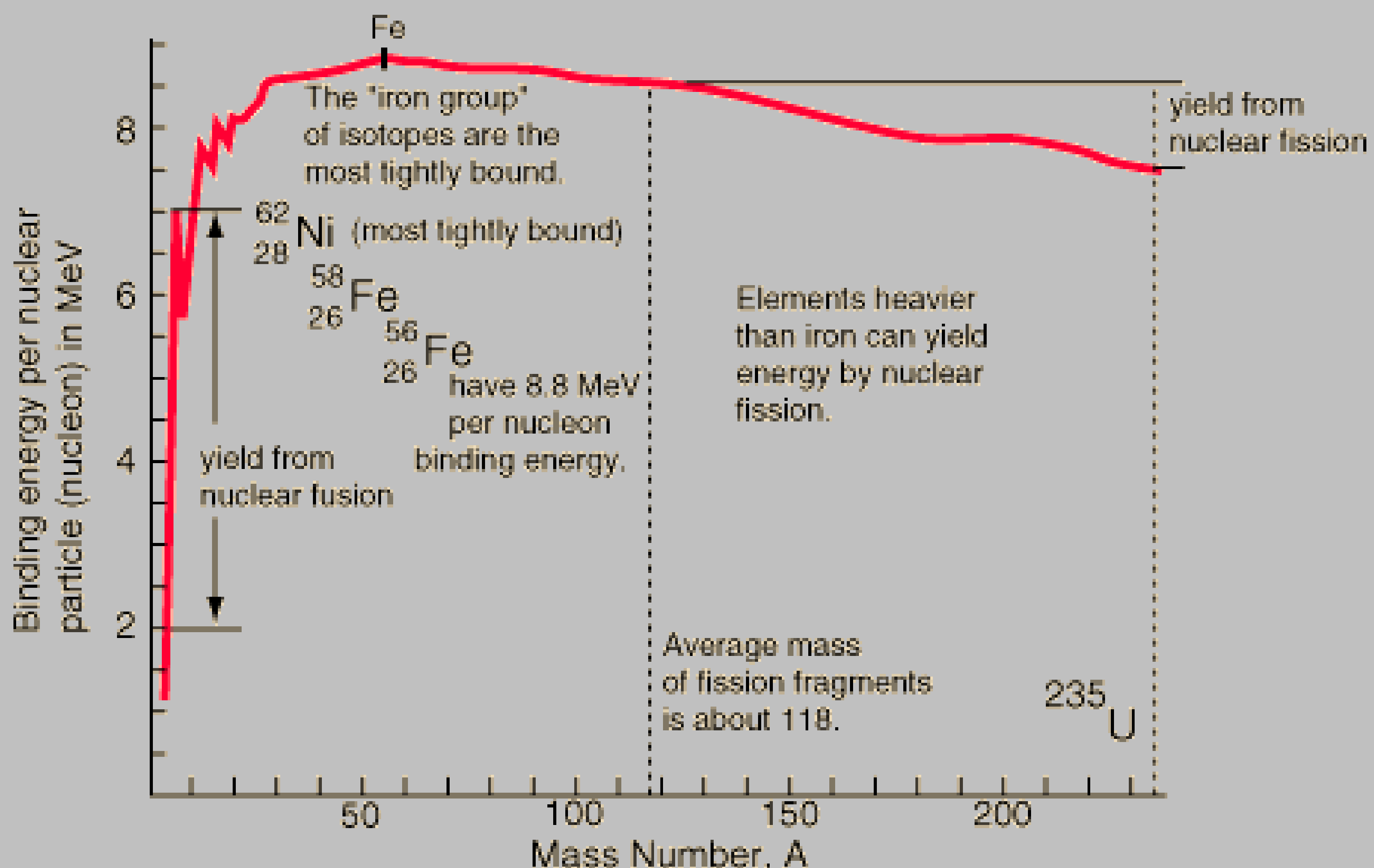
Štěpení ^{235}U – řetězová reakce



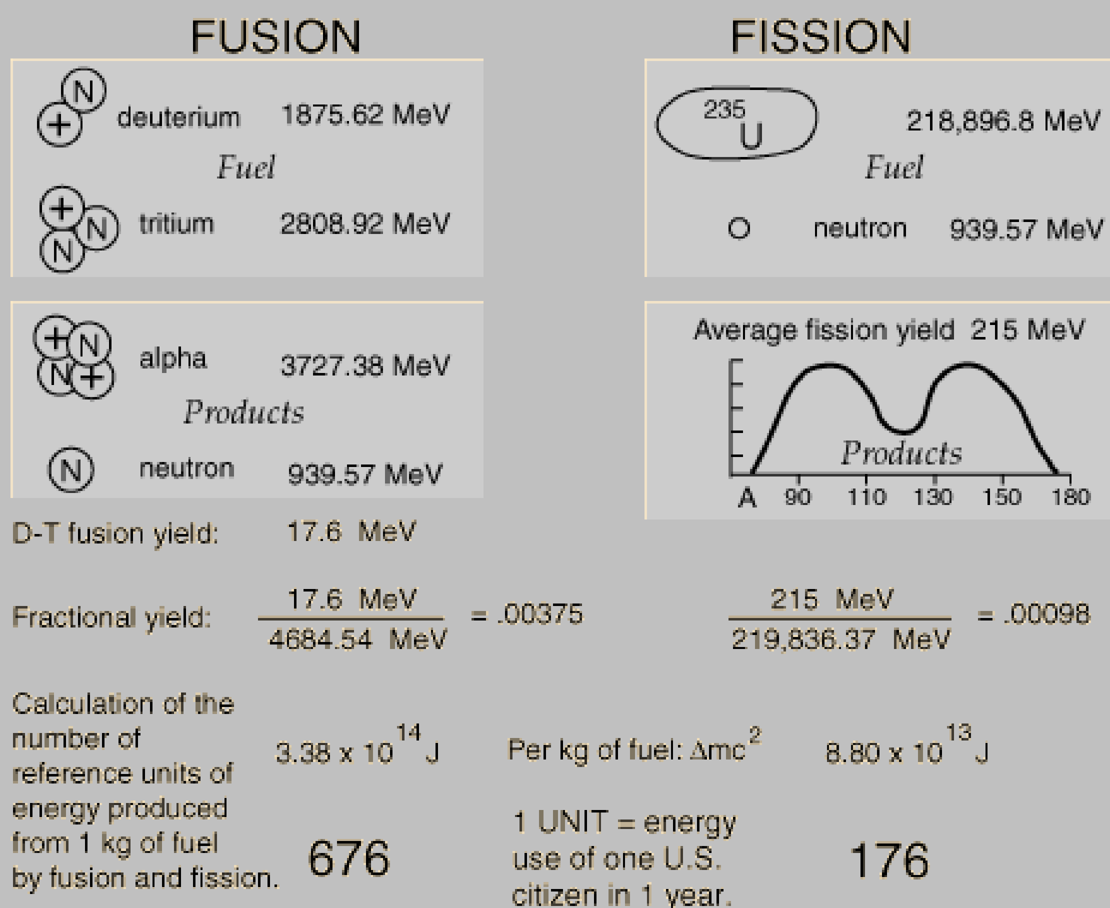
Množivá („breeding“) reakce neštěpitelného ^{238}U –> ^{239}Pu



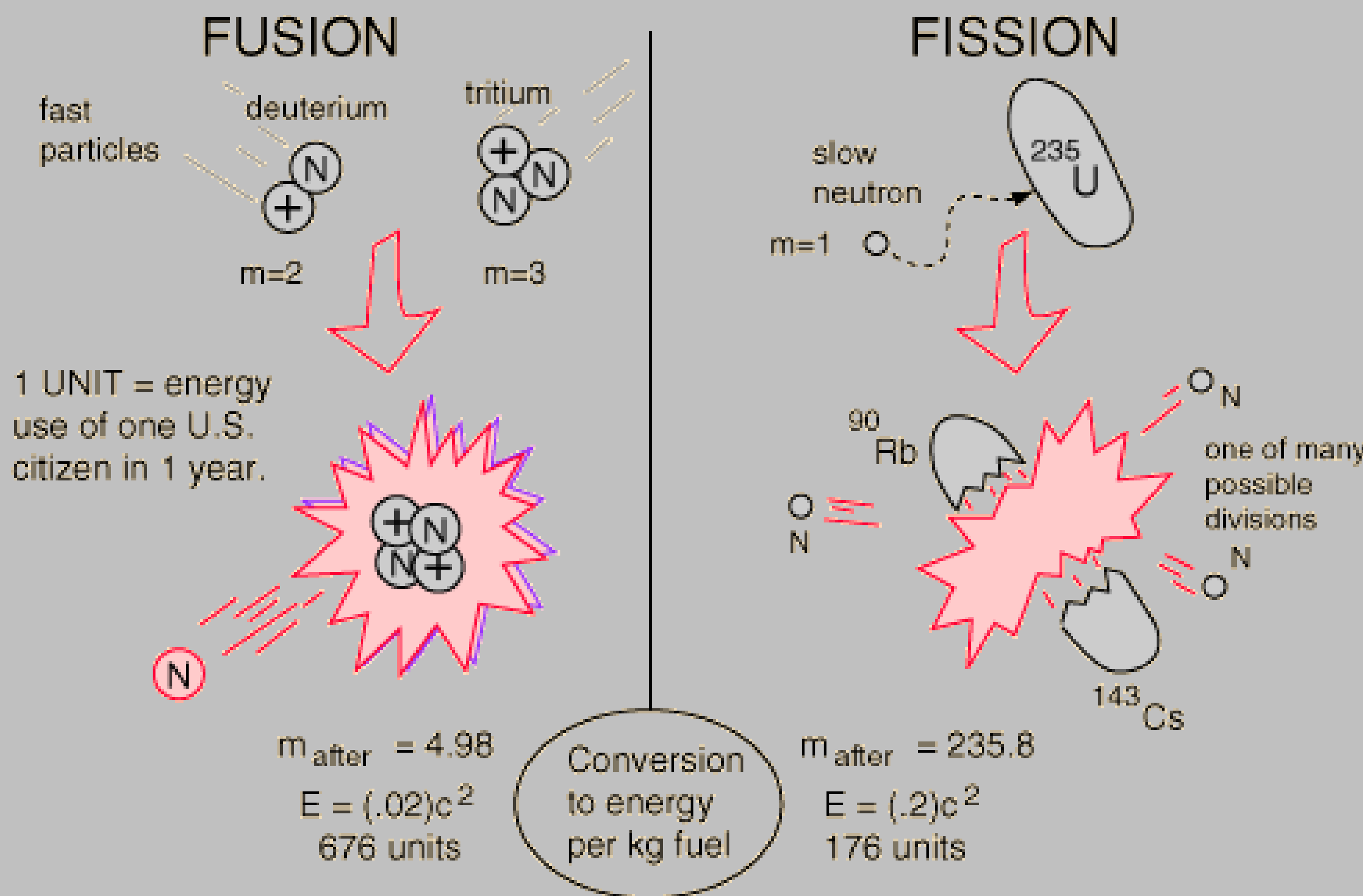
Vazební energie na nukleon: možnosti štěpení a fúze (syntézy)



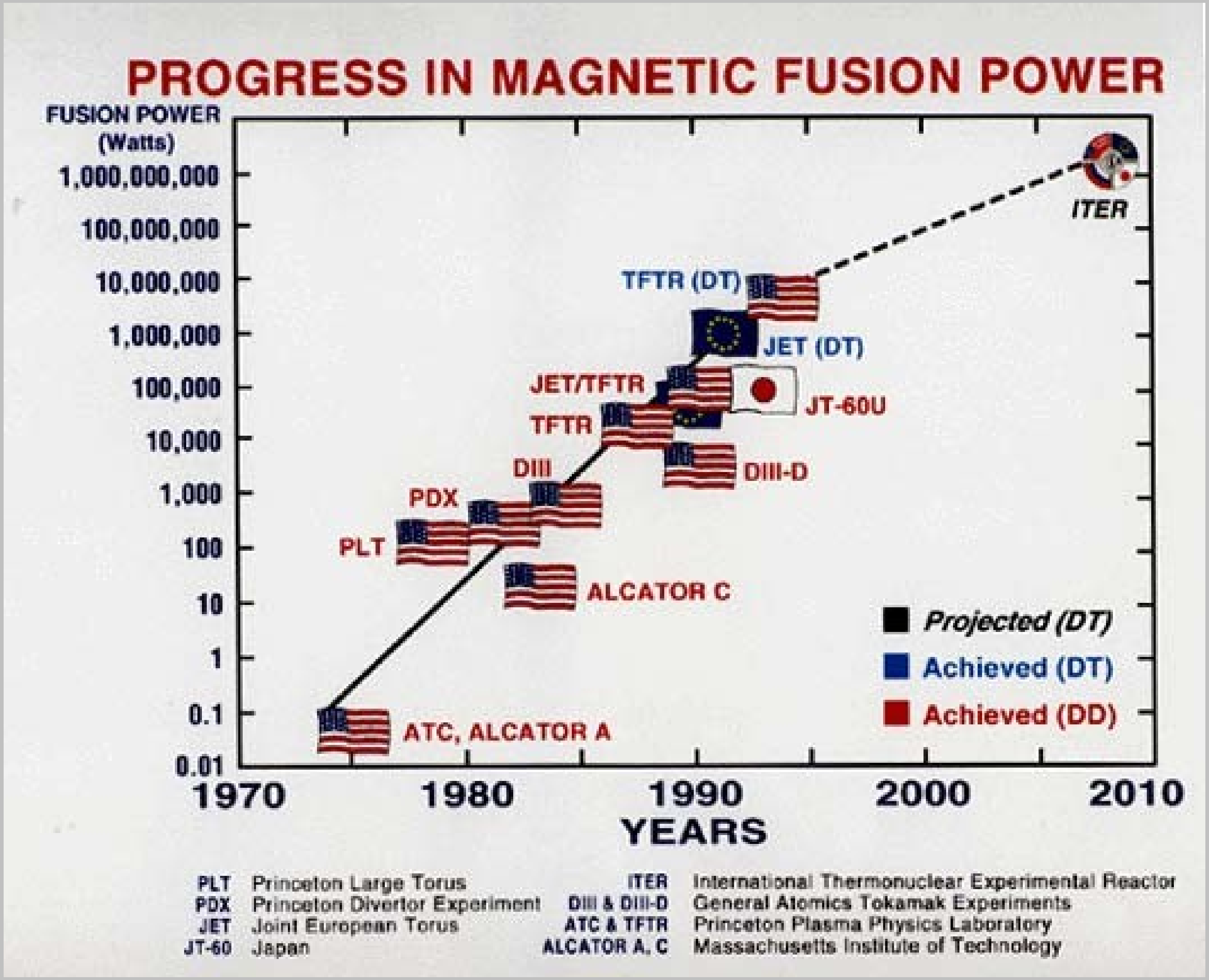
Srovnání jaderné fúze a štěpení



Srovnání jaderné fúze a štěpení



Výkon dosažený jadernou fúzí (rekordní TFTR v Princetonu byl zrušen)



Podmínky pro fúzi