Секция III, стендовый доклад 9

ВЛИЯНИЕ МНОГОКРАТНЫХ СТОЛКНОВЕНИЙ НА ПРОБЕГИ ИОНОВ В МИШЕНЯХ КОНЕЧНОЙ ТОЛЩИНЫ

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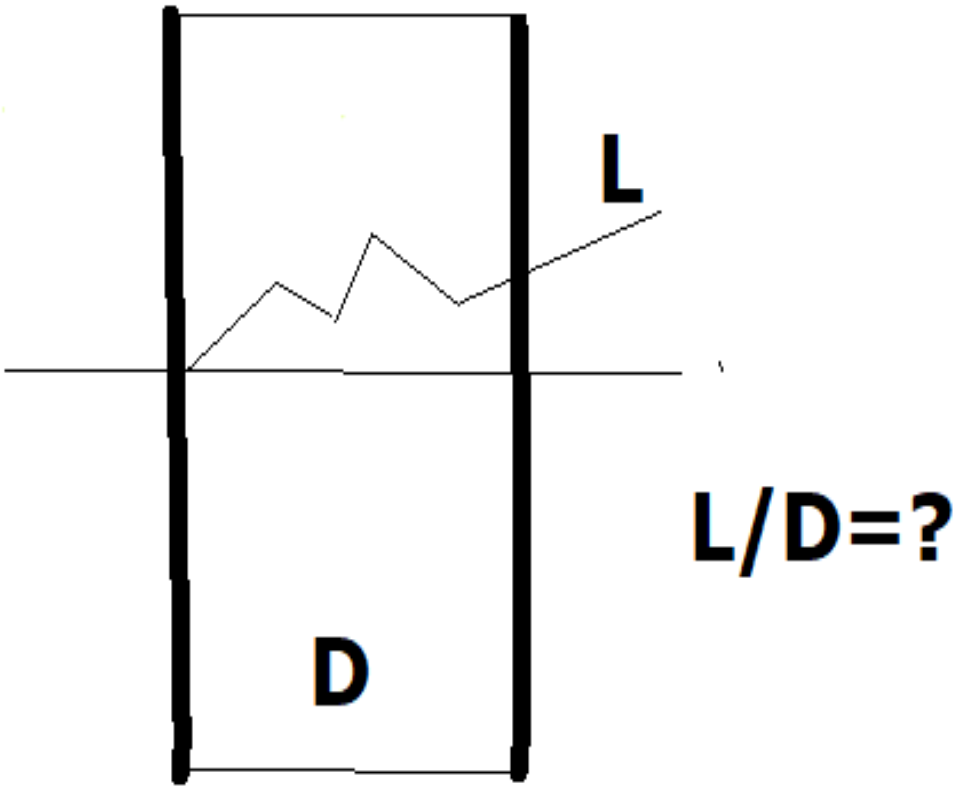

The effect of multiple scattering on the average path length of ions passing through a thin film

Computer simulation. To investigate the problem, we used the computer simulation program PAOLA. The differential cross section written as a function of transferred energy takes the form

$$d\sigma = \frac{(1+\epsilon)\,du}{(1+\epsilon u)^2}$$

Equation of transfer. The distribution function $f(x,t,\mu)$ depends on the target depth x, path length t and directional cosine μ. Transport equation

$$\mu\frac{\partial f}{\partial x} + \frac{\partial f}{\partial t} + f(x,t,\mu) = \int_{-1}^{1} \sigma(\mu,\mu')\, f(x,t,\mu')\, d\mu'$$

Laplace transformation

$$F(x,s,\mu) = \int_{0}^{\infty} e^{-st} f(x,t,\mu)\, dt$$

One-velocity equation of transfer

$$\mu\frac{\partial F}{\partial x} + (s+1)\,F = \int_{-1}^{1} \sigma(\mu,\mu')\, F(x,s,\mu')\, d\mu'$$

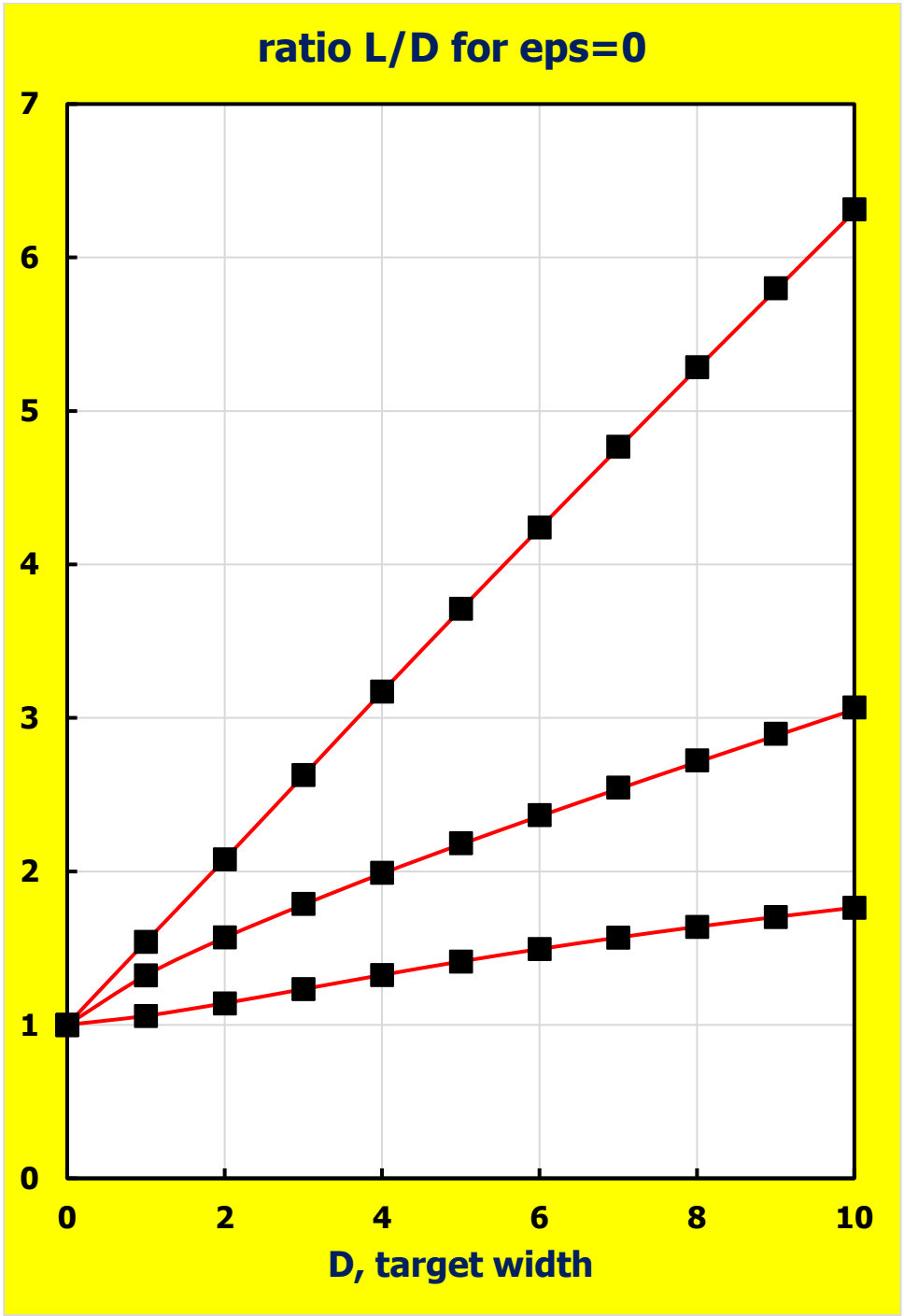

Figure 1
The ratio L/D as a function of target thickness for the hard sphere potential and different ion to atom mass ratios: A=0 (upper line), A=1 and A=2 (lower line) obtained from equation of transfer. Markers – results of computer simulation.

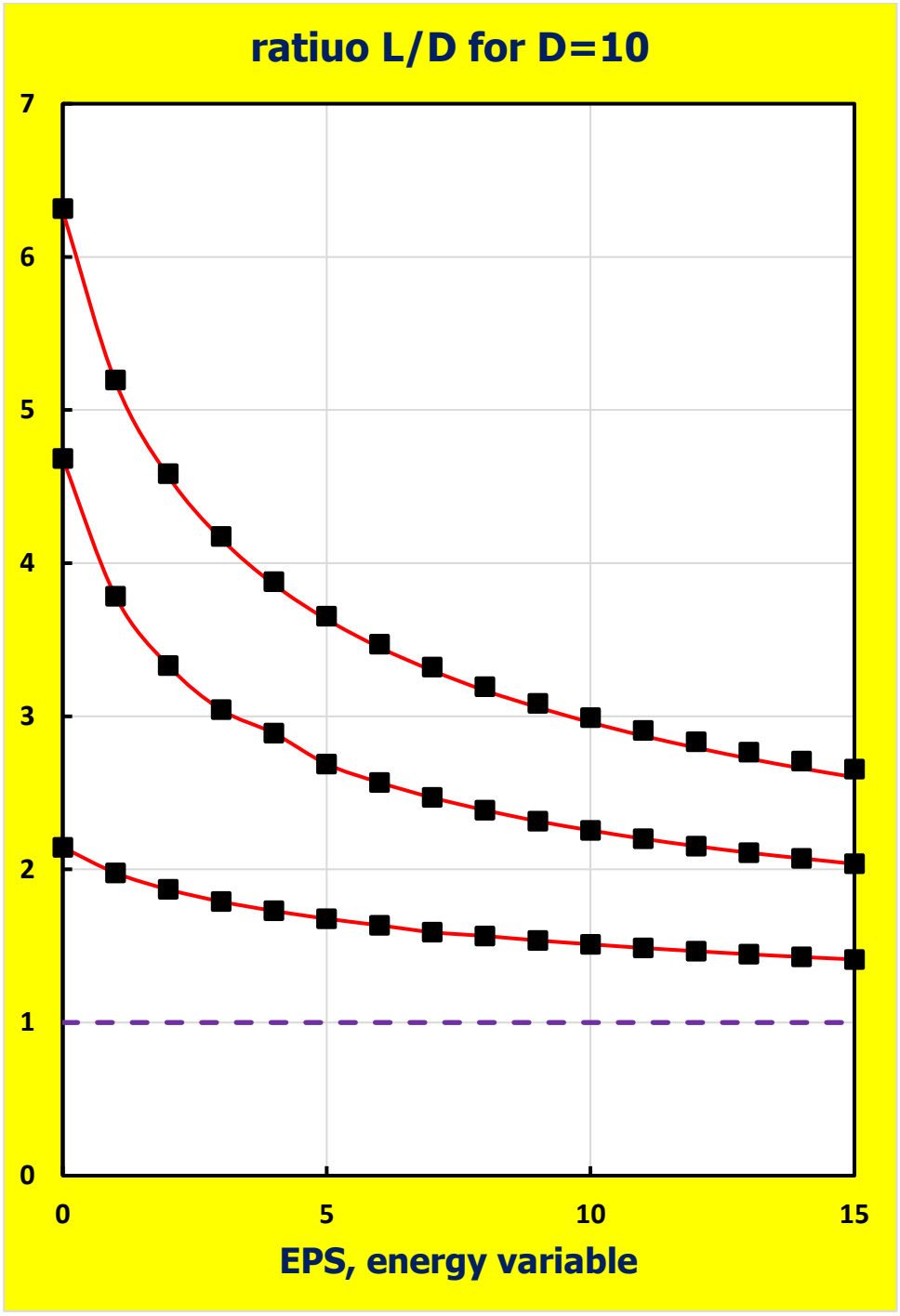

Figure 2
The ratio L/D as a function of energy variable for the target thickness D=10 obtained by computer simulation. Ion to atom mass ratios: A=0 (upper markers), A=1, A=2 (lower markers). Solid lines – theoretical results.