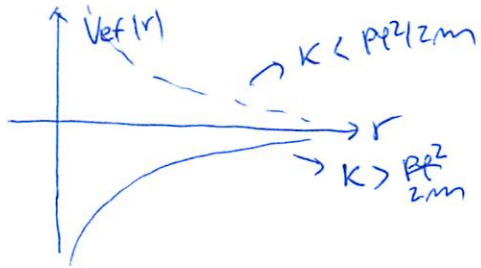


SIPALNI PRESEK ZA ZDRUŽITEV DELCEV

Imejimo privlačni potencial $V(r) = -\frac{K}{r^m}$, $m \geq 2$. Poišči sipalni preseki za združitev delcev (delca se združita, ko je $r=0$). Ker so primeri $m=2$ in $m>2$, jih obravnavaj po sebi!

NAMIGI:

• $m=2$: $H = \frac{mv_0^2}{2} + V_{ef}(r)$; $V_{ef} = \frac{1}{r^2} \left(\frac{p_0^2}{2m} - K \right)$



- Pogoji: $K > p_0^2 / 2m$

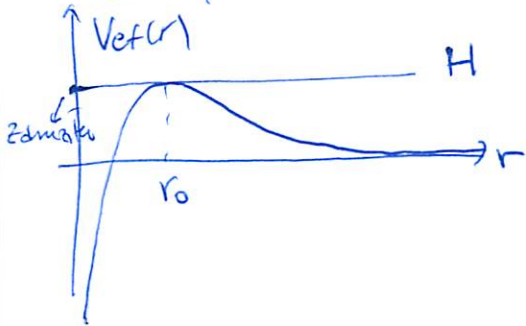
$p_0 = mv_0 b$

- Najmi b_{max} , da se združita:

$$K = \frac{p_{0max}^2}{2m} = \frac{m^2 v_0^2 b_{max}^2}{2m}$$

$$\Rightarrow \sigma = \pi b_{max}^2 = \frac{2\pi K}{mv_0^2}$$

• $m > 2$; recimo $m=3$:



$$V_{ef} = \frac{p_0^2}{2mr^2} - \frac{K}{r^3}$$

- Pogoji: $H > V_{ef}(r_0)$

- Poišči r_0 iz $\frac{\partial V_{ef}}{\partial r} \Big|_{r=r_0} = 0 \Rightarrow r_0 = \frac{3Km}{p_0^2}$

$$V_{ef}(r_0) = \frac{p_0^2}{6mr_0^2}$$

- $H = \frac{1}{2}mv_0^2 > \frac{p_0^2}{6mr_0^2}$

- Najmi b_{max} : $\frac{1}{2}mv_0^2 = \frac{p_{0max}^2}{6mr_0^2}$

Izrazi $p_{0max} = mv_0 b_{max}$ in $r_0^2 = b_{max}^2$

in dobis: $\sigma = \pi b_{max}^2 = 3\pi \left(\frac{K}{mv_0^2} \right)^{2/3}$