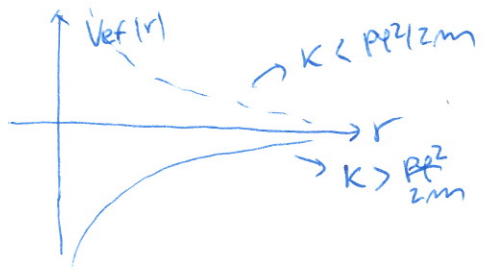


SIPALNI PRESEK ZA ZDRUŽITEV DELCEV

Imejmo 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:

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



- Pogoj: $K > \frac{p_{\varphi}^2}{2m}$

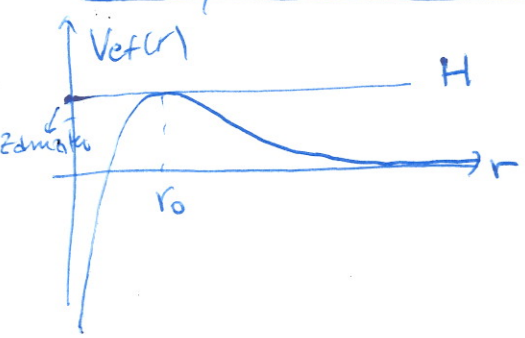
$p_{\varphi} = mv_0 b$

- Najmi b_{max} , da se združita:

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

$$\Rightarrow \sigma = \pi b_{max}^2 = \frac{2\pi K}{m v_0^2}$$

• $m > 2$: recimo $m=3$:



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

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

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

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

- $H = \frac{1}{2} m v_0^2 > \frac{p_{\varphi}^2}{6mr_0^2}$

- Najmi b_{max} : $\frac{1}{2} m v_0^2 = \frac{p_{\varphi max}^2}{6mr_0 max^2}$

Izrazi $p_{\varphi max} = m v_0 b_{max}$ in $r_0 max = b_{max}$

in dobis: $\sigma = \pi b_{max}^2 = 3\pi \left(\frac{K}{m v_0^2} \right)^{2/3}$