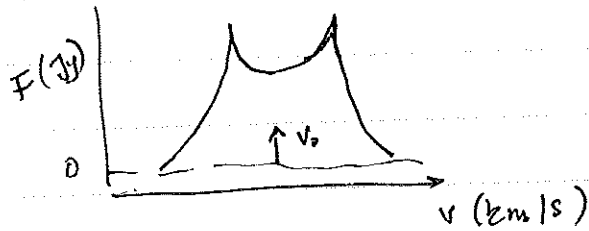


Tully - Fisher relacija

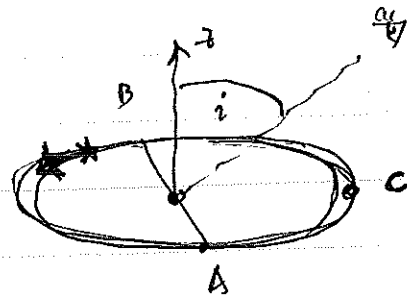
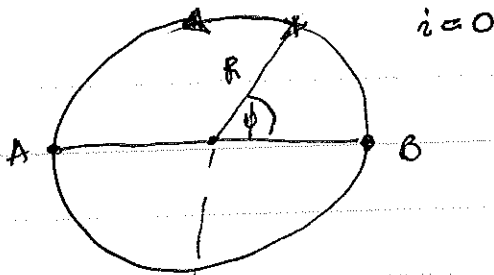


v_{max} , peak rot speed?

→ single dish obs, HI

- jer mnogo plina leži na $R >$ gdje je $v_{rot} = \text{cte}$
- većina emisije se skuplja u 2 vrha
- DOUBLE HORN PROFIL karakterističan za rot profile gdje \exists rast na $r \ll \text{pa cte za } R >$

rotirajući disk gledan odložno



- pp: kružno gibanje $v(r)$

- radius R , azimutalni kut ϕ

- možemo detektirati samo radijalnu komponentu v_r ,
 v_r u centru galaksije $\equiv v_{sys}$ (sistemaska brzina)

$$v_r(R, i) = v_{sys} + v(R) \sin i \cos \phi$$

ekstremi: $i=0$ face-on $\Rightarrow v_r = v_{sys}$

$i=90$, edge-on
 $\sin i = 1$

$\phi=0: v_r = v_{sys} + v(R)$

$\phi=90: v_r = v_{sys}$

* razlika najveće i najmanje mjerene brzine

$$\begin{aligned} v_{r,max} &= v_{sys} + v_{max} \sin i \\ v_{r,min} &= v_{sys} - v_{max} \sin i \end{aligned}$$

$$\Delta v = W = 2 v_{max} \sin i$$

UVID U IZVOR TULLY-FISHER RELACIJE

$$M = \frac{v_{\max}^2 R}{q}$$

$$PP : \frac{M}{L} \equiv \frac{1}{C_{ML}} \quad \text{† spiralne galaksije}$$

$$\Rightarrow L = C_{ML} \frac{v_{\max}^2 R}{q}$$

$$PP : \frac{L}{R^2} \equiv C_{SB} \quad \text{† spiralne galaksije}$$

$$\rightarrow L^2 = C_{ML}^2 \frac{v_{\max}^4 R^2}{q^2}$$

$$= C_{ML}^2 \frac{v_{\max}^4}{q^2} \frac{L}{C_{SB}}$$

$$\Rightarrow L = \frac{C_{ML}^2}{C_{SB} q^2} v_{\max}^4 = C_1 \cdot v_{\max}^4$$

$$M = -2.5 \log L + C_2$$

$$= -2.5 \log C_1 v_{\max}^4 + C_2$$

$$= -10 \log v_{\max} + C_3$$