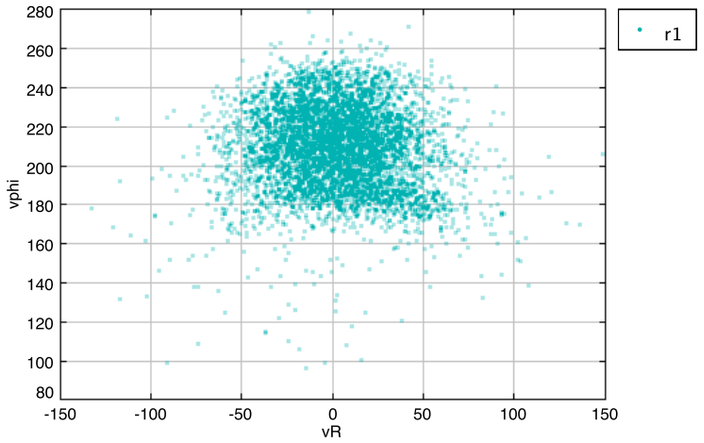
# Constraining the bar pattern speed with moving groups.

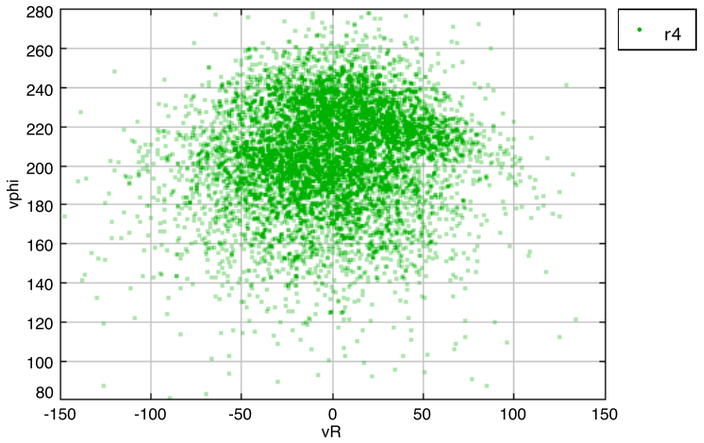
Giacomo Monari

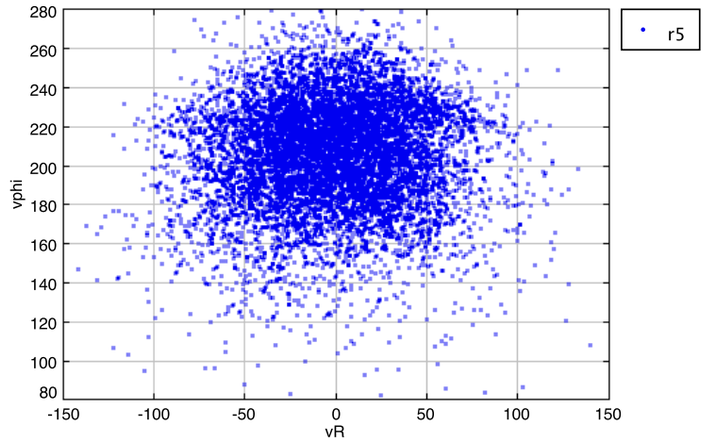
# Mock MW

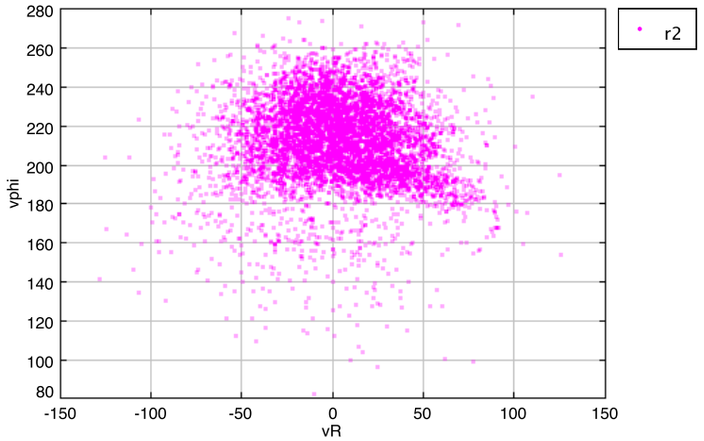
- Test particle simulation from the Barcelona group
- Two bars
- Bars pattern speed $\Omega_b$=50 km/sec/kpc
- Gaia-esque errors

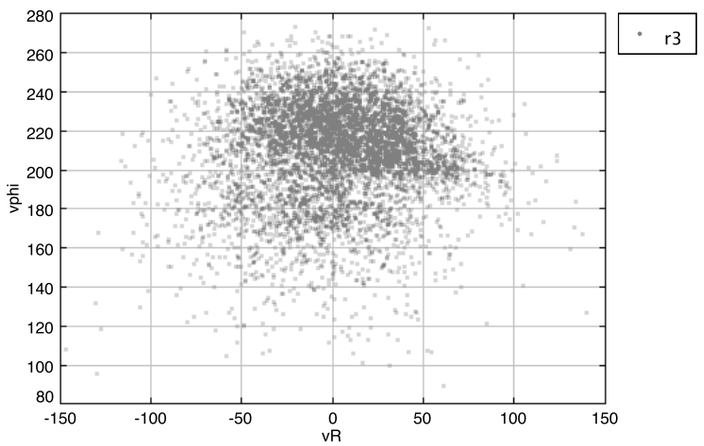
# The velocity distribution is full of substructures in the selected volumes.

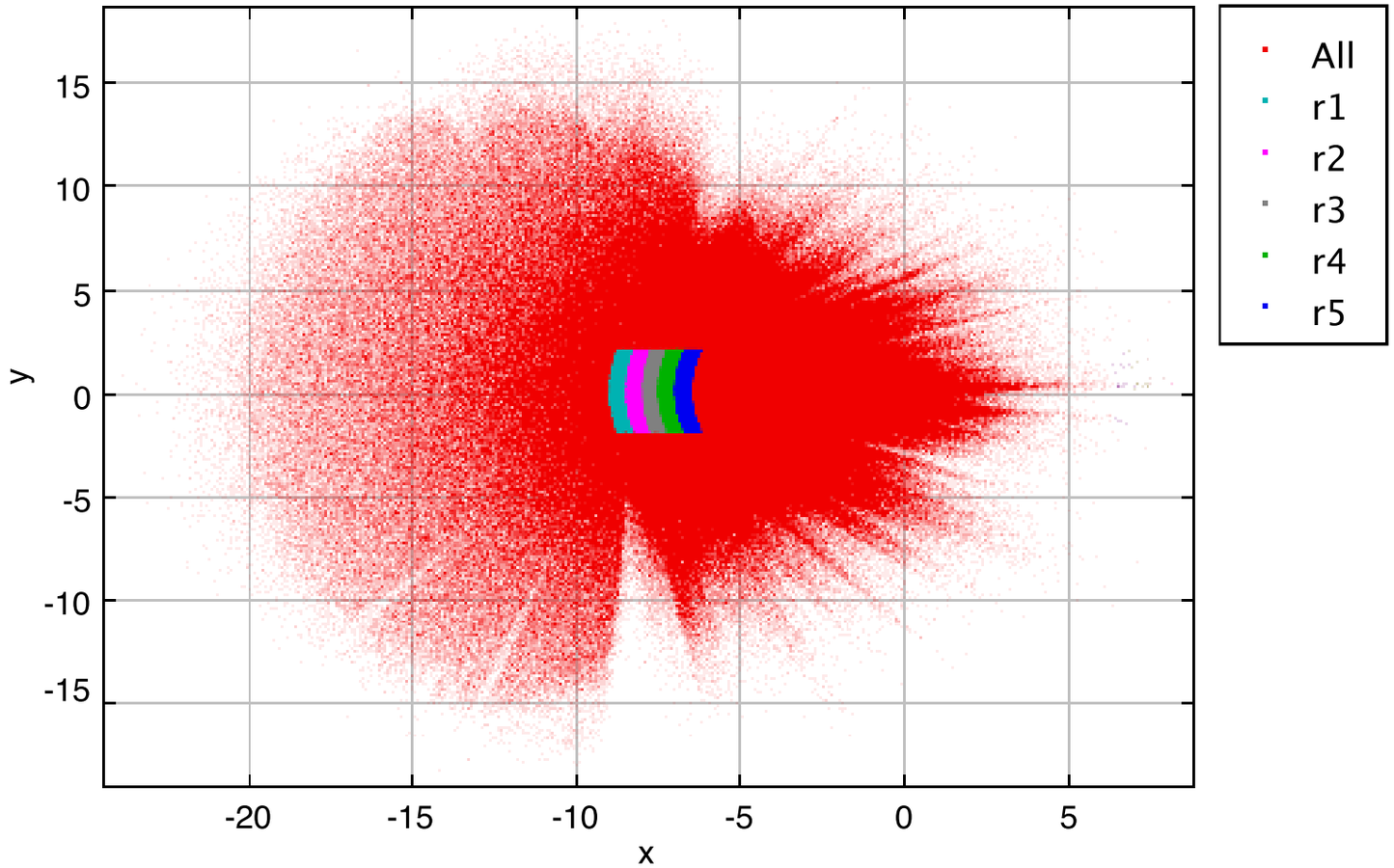


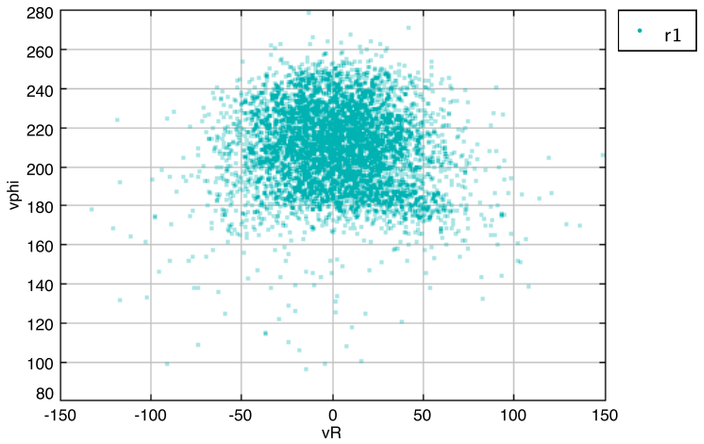



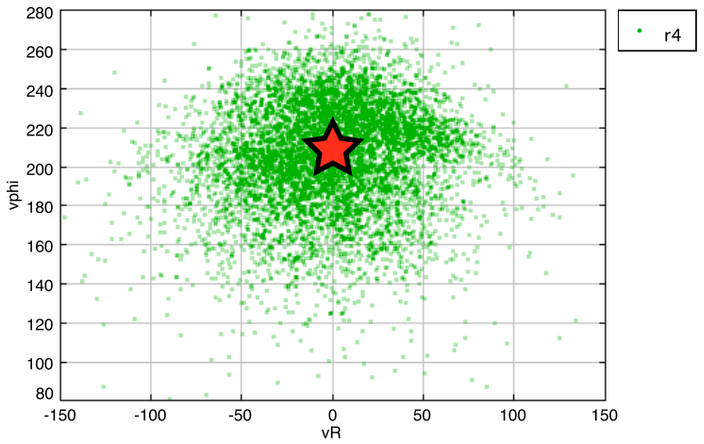



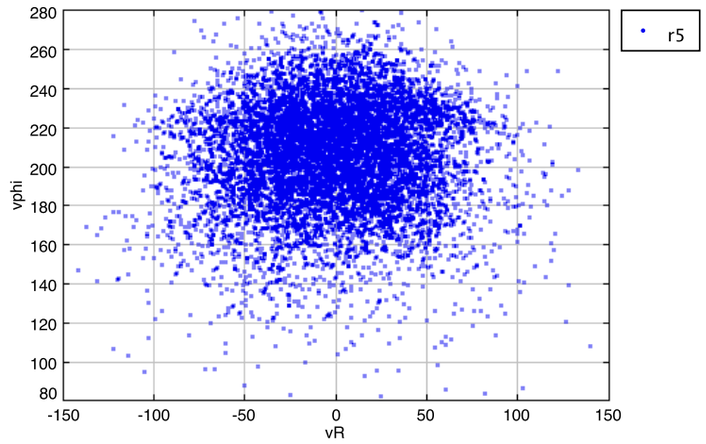



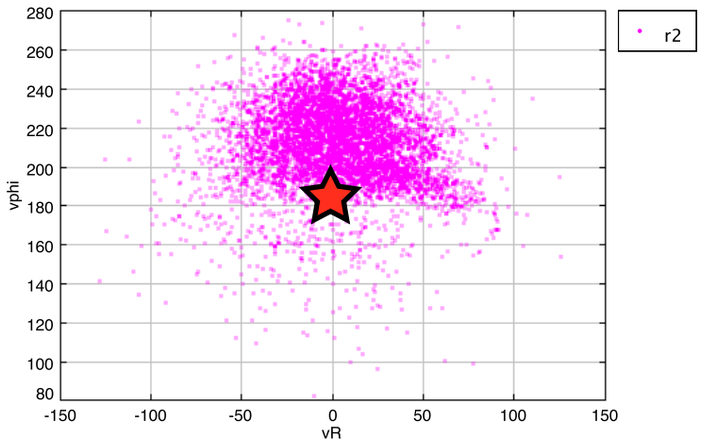



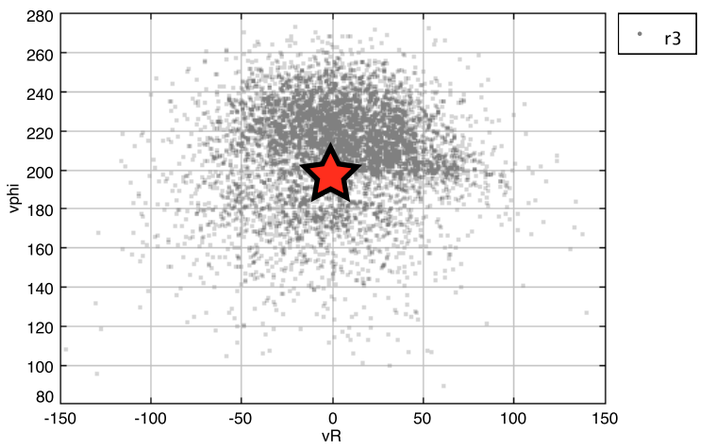
# We assume that the distribution is split in $v_\Phi$ in correspondence with OLR.

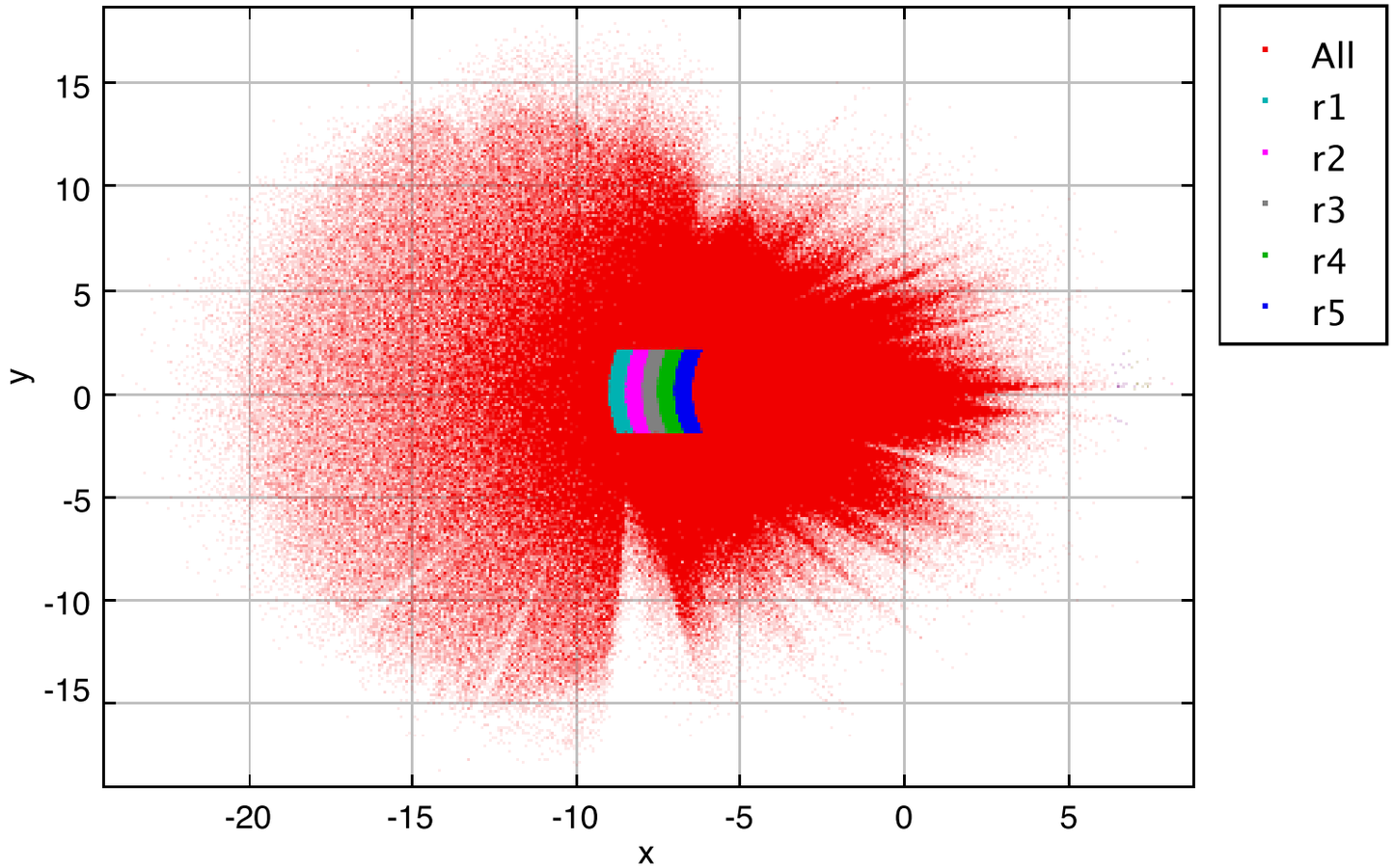


For a flat circular velocity curve $v_0$

$$v_{\rm OLR} \approx \frac{R v_0}{R_{\rm OLR}} \left( 3 - 2 \frac{R}{R_{\rm OLR}} \right)$$

$$R_{\rm OLR} = \frac{v_0}{\Omega_{\rm b}} \left( 1 + \frac{1}{\sqrt{2}} \right)$$

# Fixing $v_0$, WITHOUT errors

| $v_0$(km/sec) | $\Omega_b$(km/sec/kpc) |
|---|---|
| 200 | 48±2 |
| 210 | 51±1 |
| 220 | 58±3 |
| 230 | 61±3 |

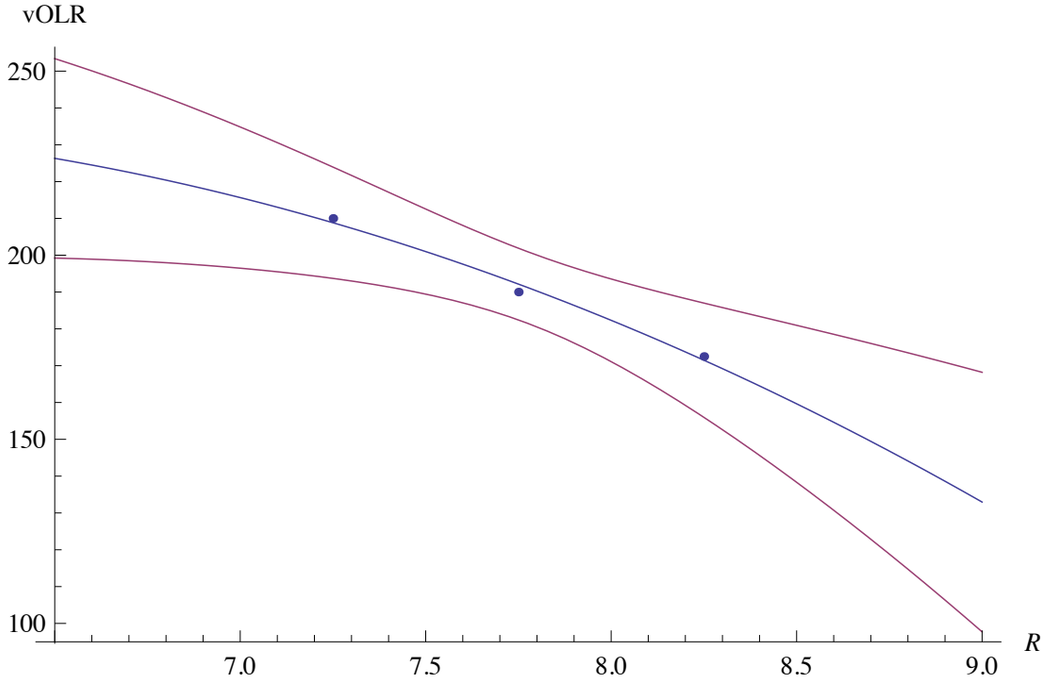
# Fixing $v_0$, WITH errors

| $v_0$(km/sec) | $\Omega_b$(km/sec/kpc) |
|---|---|
| 200 | 49±2 |
| 210 | 51±1 |
| 220 | 58±3 |
| 230 | 61±3 |

# Leaving also $v_0$ as a free parameter

## No Errors

$v_0$=209±6 km/sec,
$\Omega_b$=49±2 km/sec/kpc




## Errors

$v_0$=203±24 km/sec,
$\Omega_b$=47±9 km/sec/kpc