



A study of the new dwarf spheroidal galaxy in Hercules

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Adén et al. (2009, arXiv:0908.3489)

Adén et al. (submitted to ApJL)

Photometry

Isaac Newton Telescope

Wide field camera

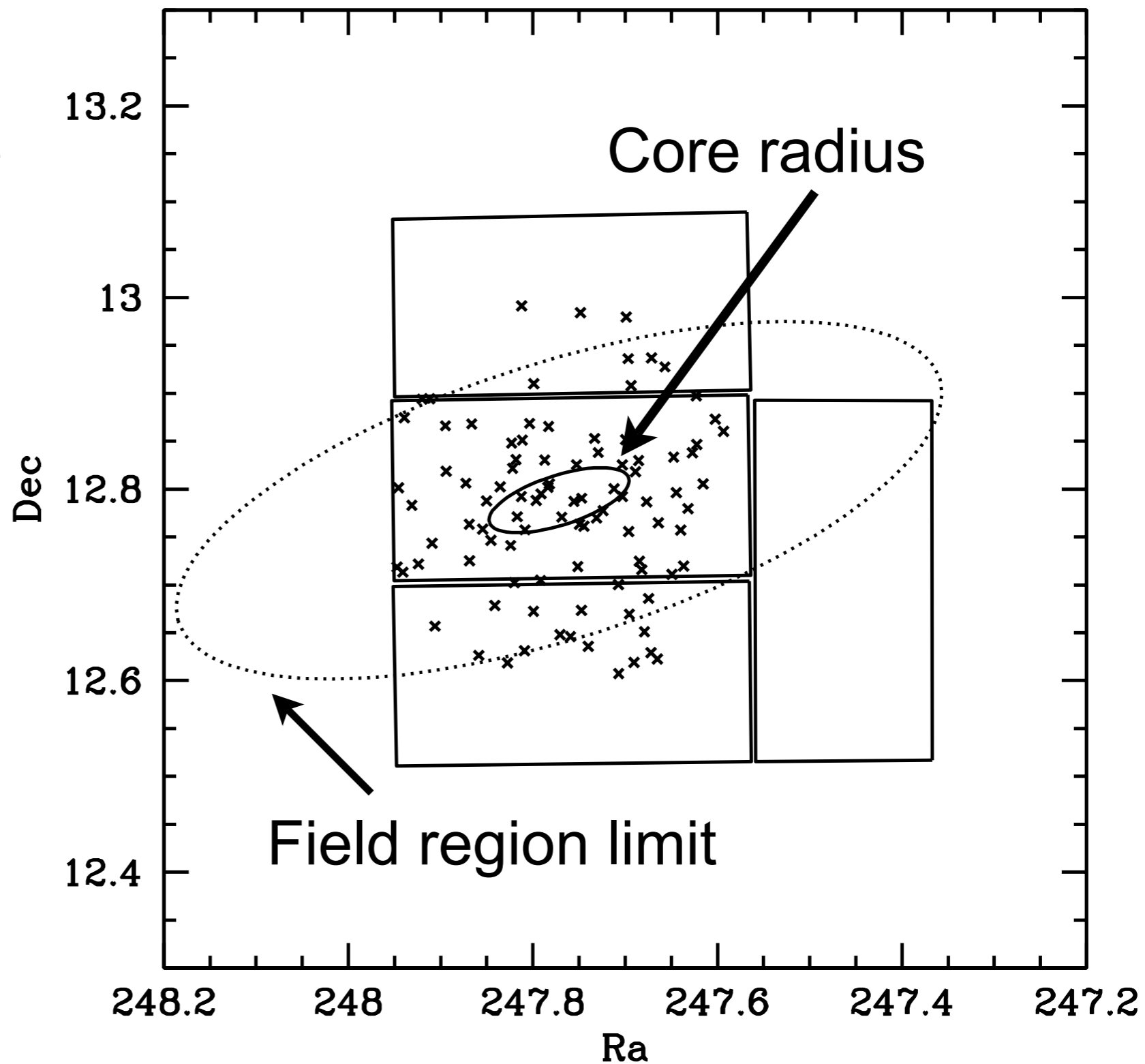
Strömgren u, v, b, y filters

Spectroscopy

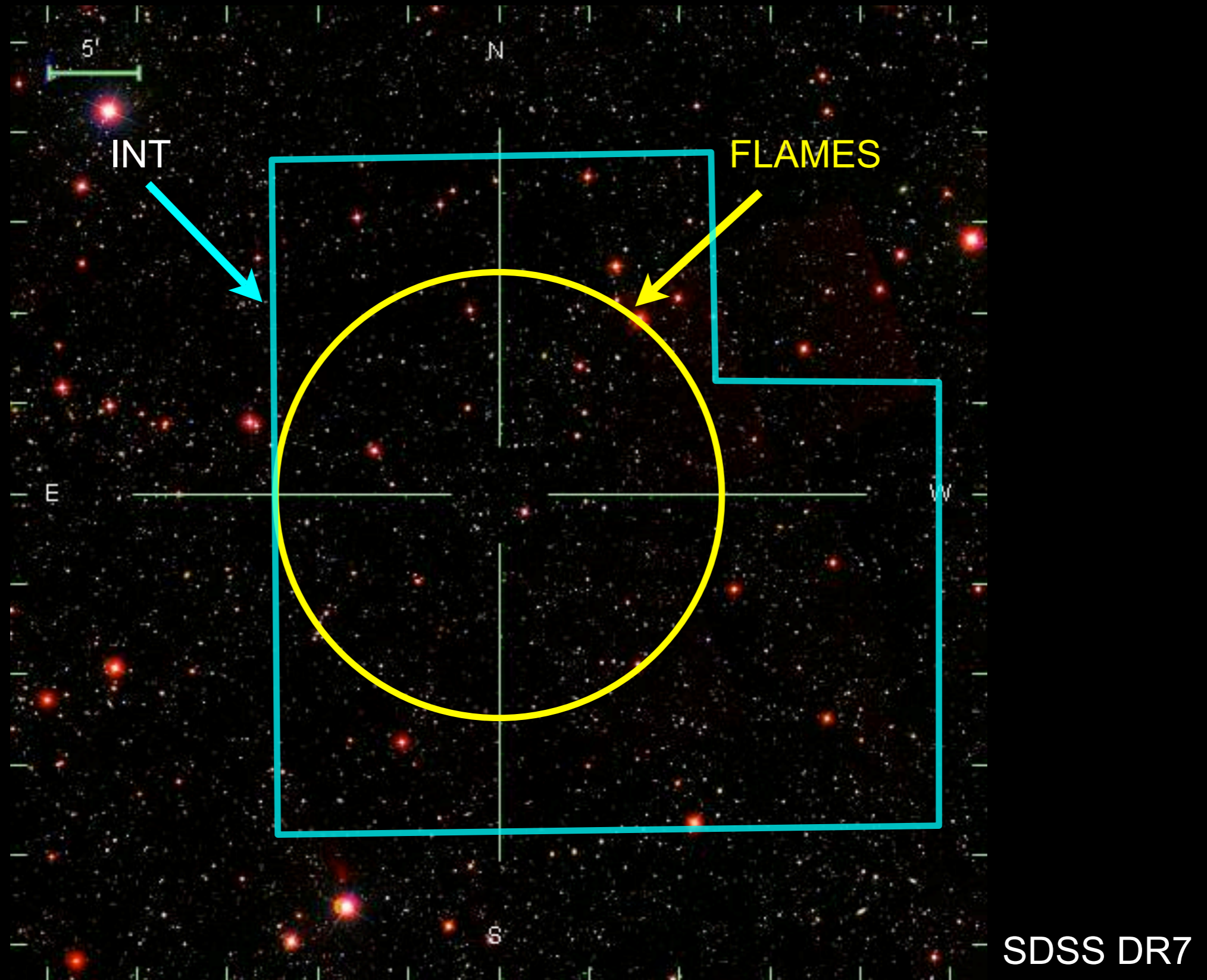
VLT-U2

FLAMES

Medusa ~100 targets

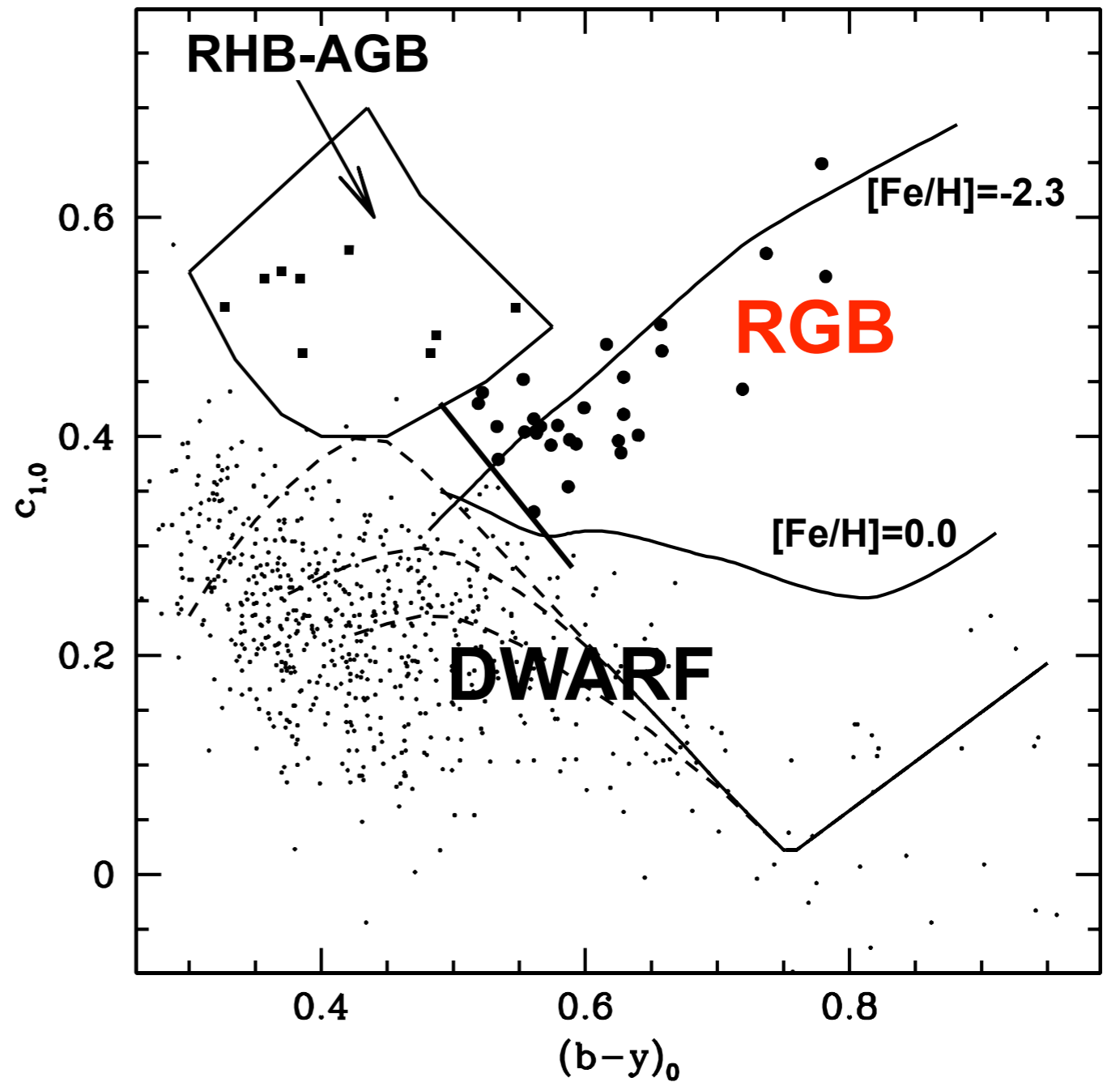
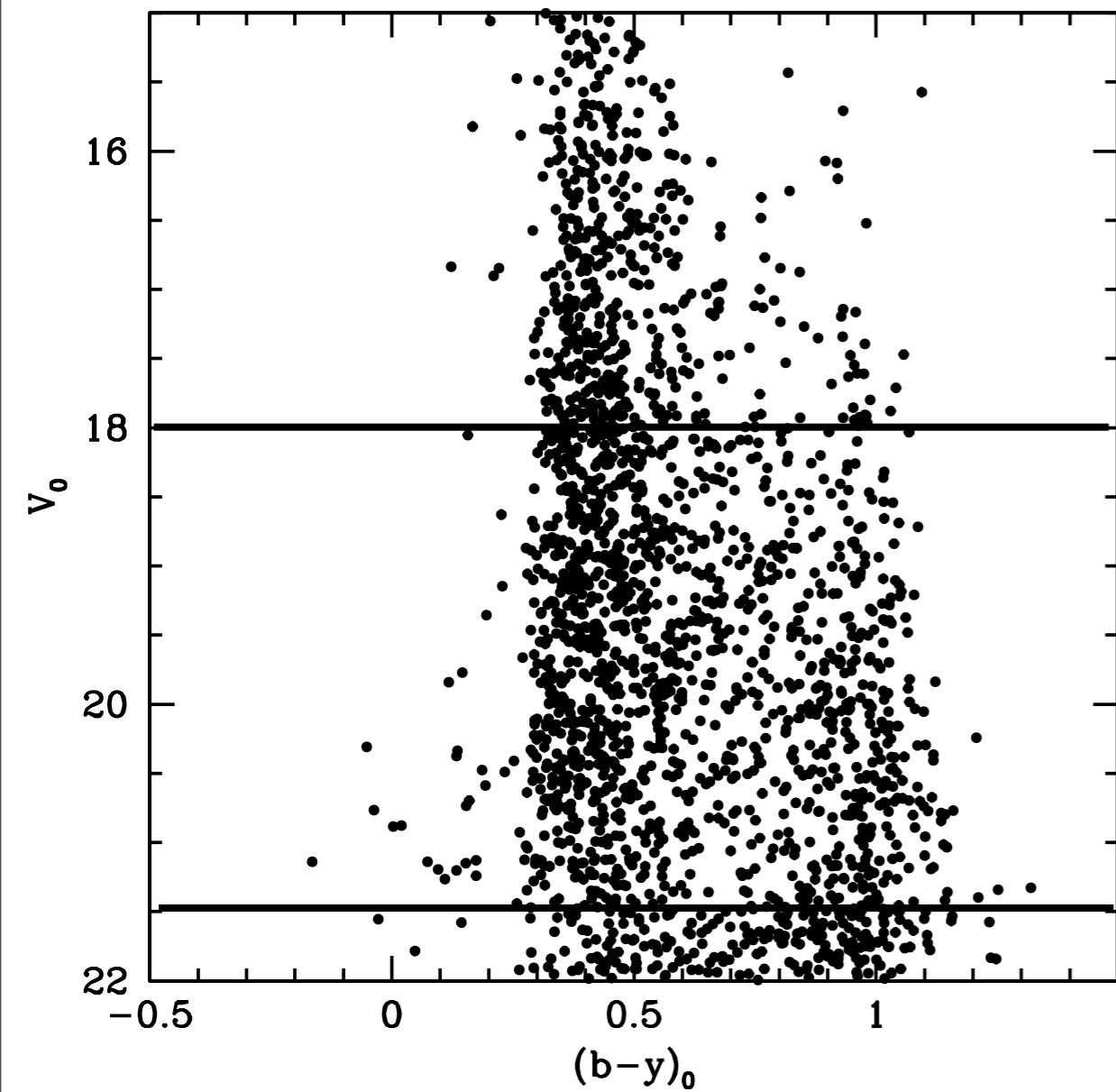


dSph galaxy or foreground star?



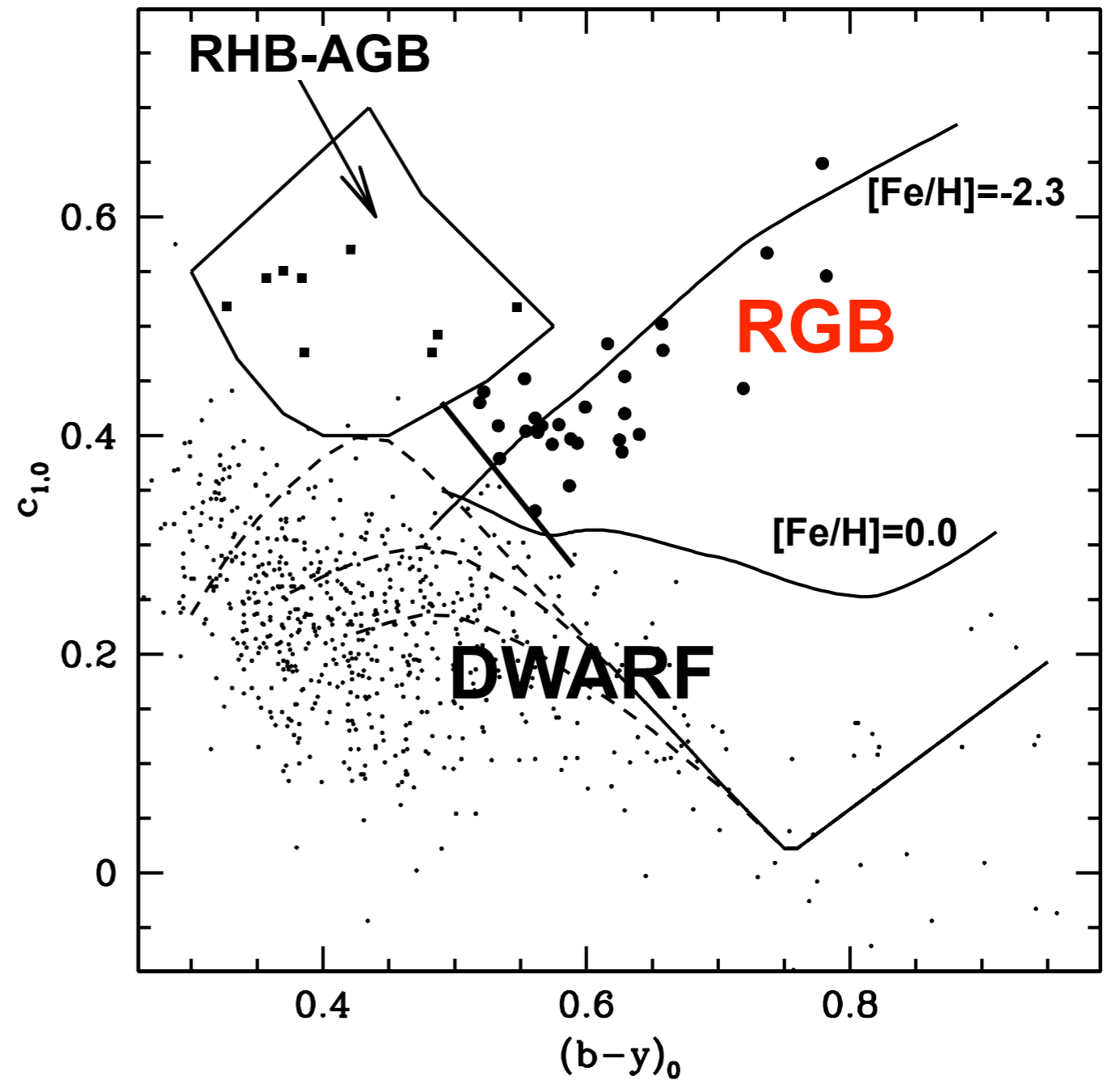
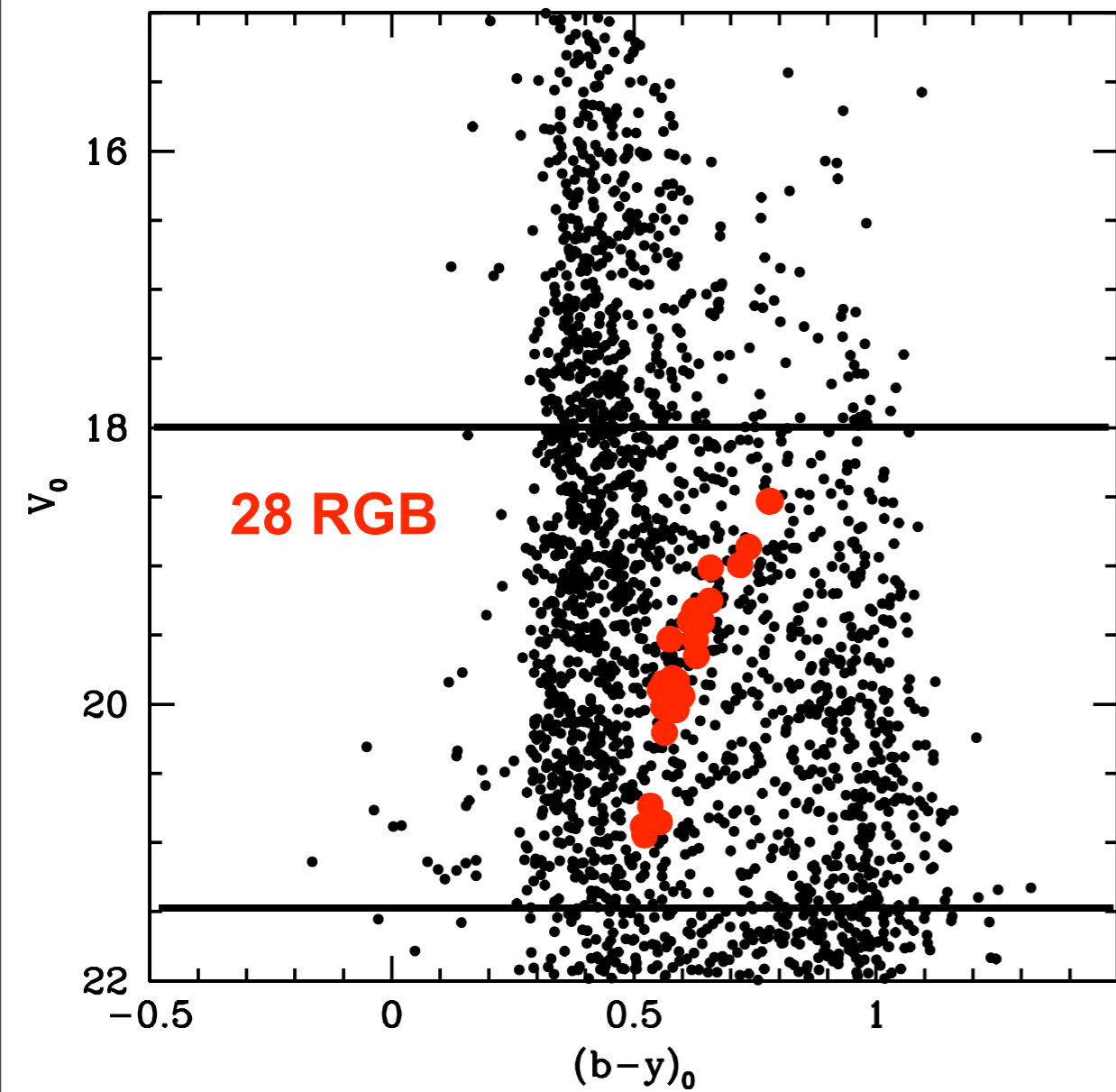
The Strömngren c_1 method

$$c_1 = (u - v) - (v - b)$$

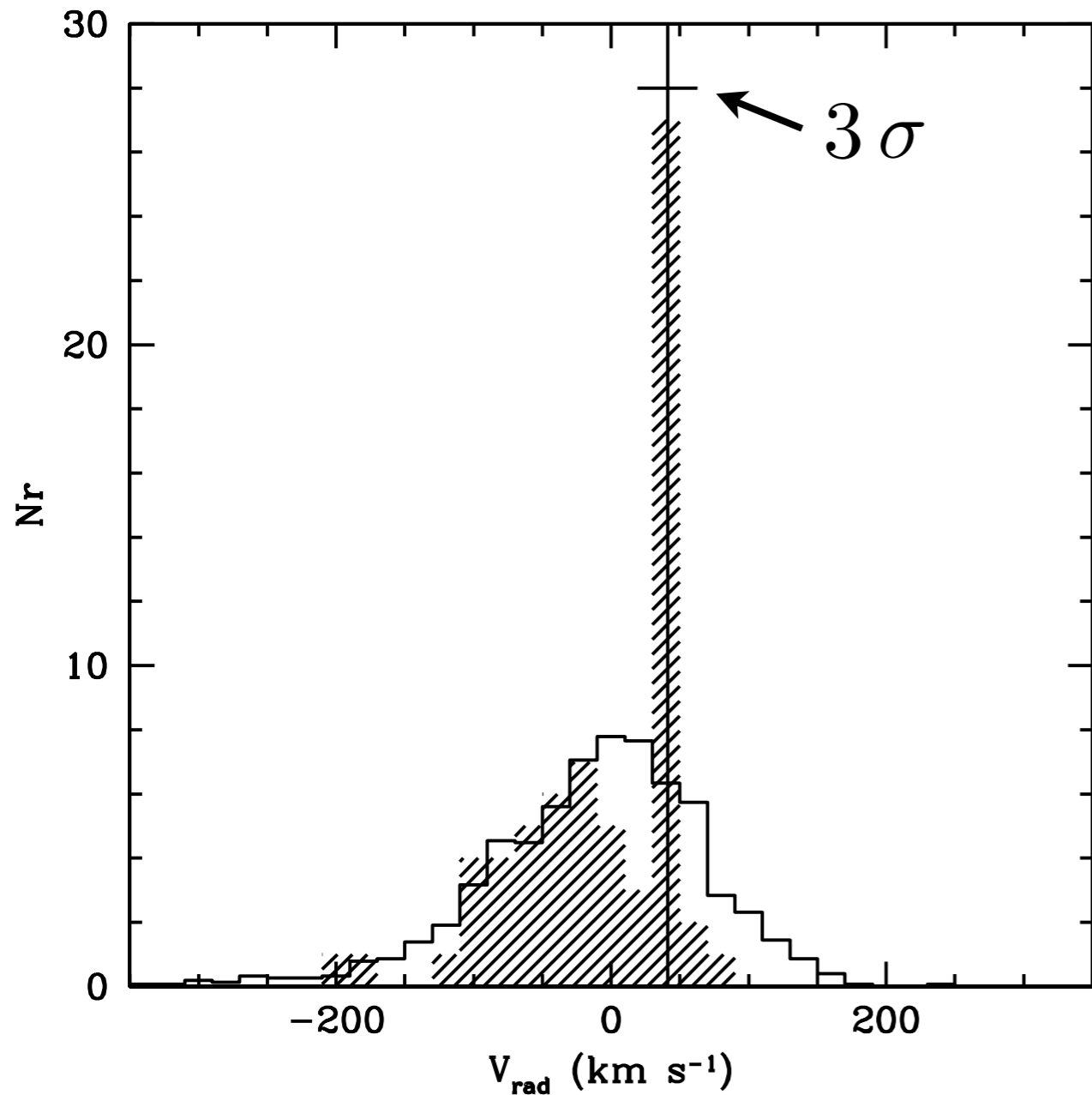


The Strömbergren c_1 method

$$c_1 = (u - v) - (v - b)$$

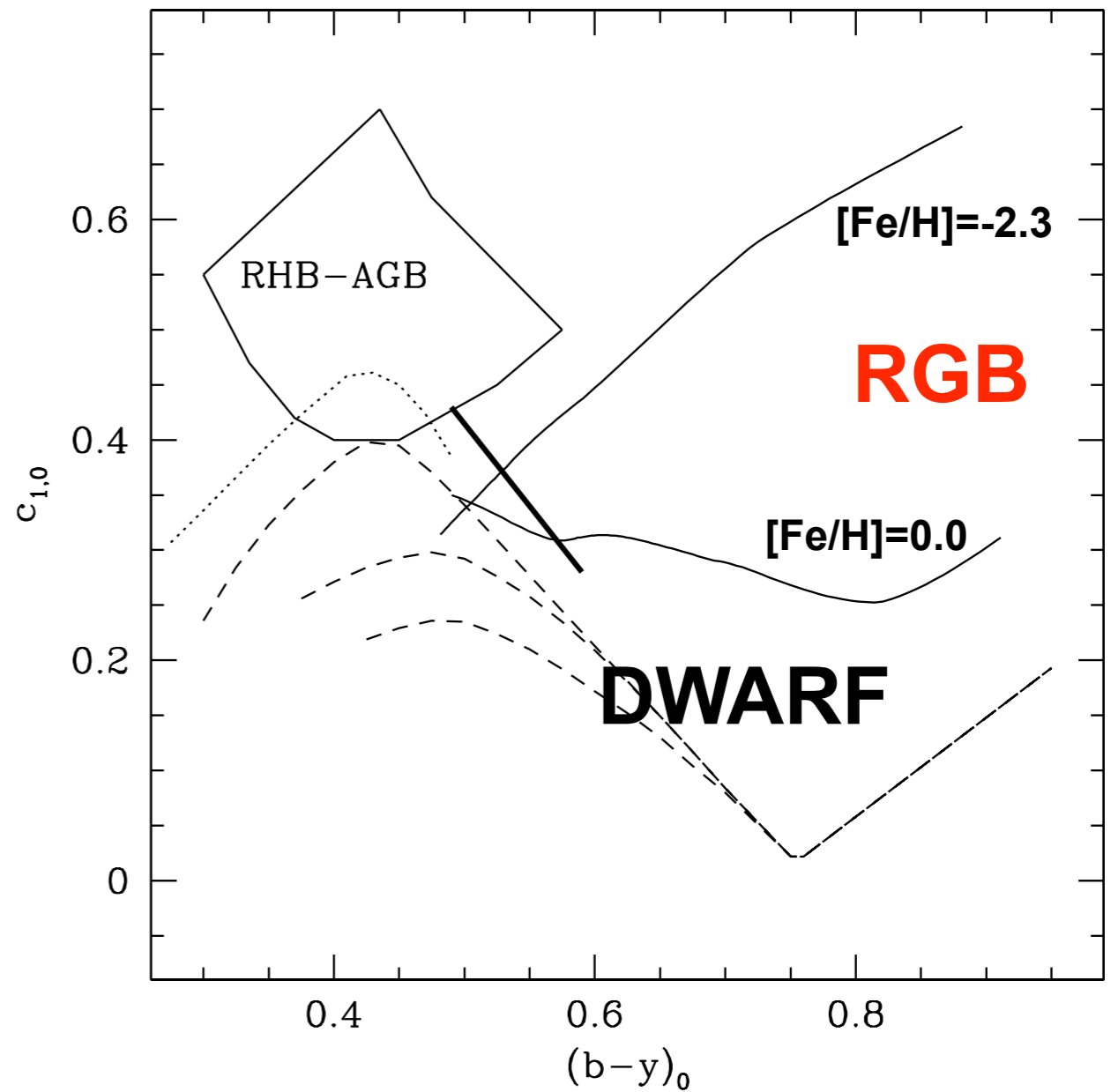


Weeding out the foreground

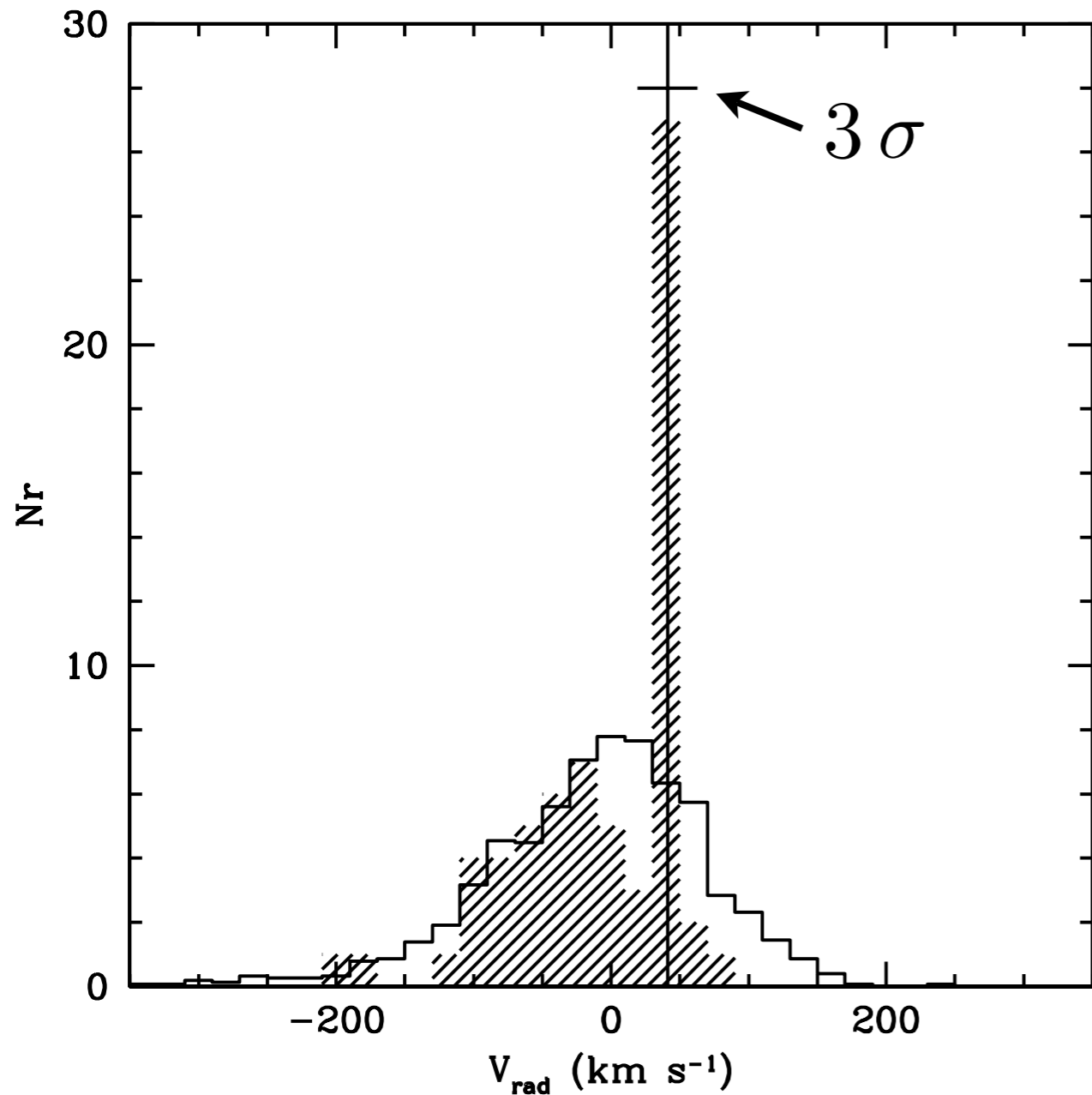


$$\langle v \rangle = 40.9 \pm 1.4 \text{ km s}^{-1}$$

$$\sigma_v = 7.3 \pm 1.1 \text{ km s}^{-1}$$

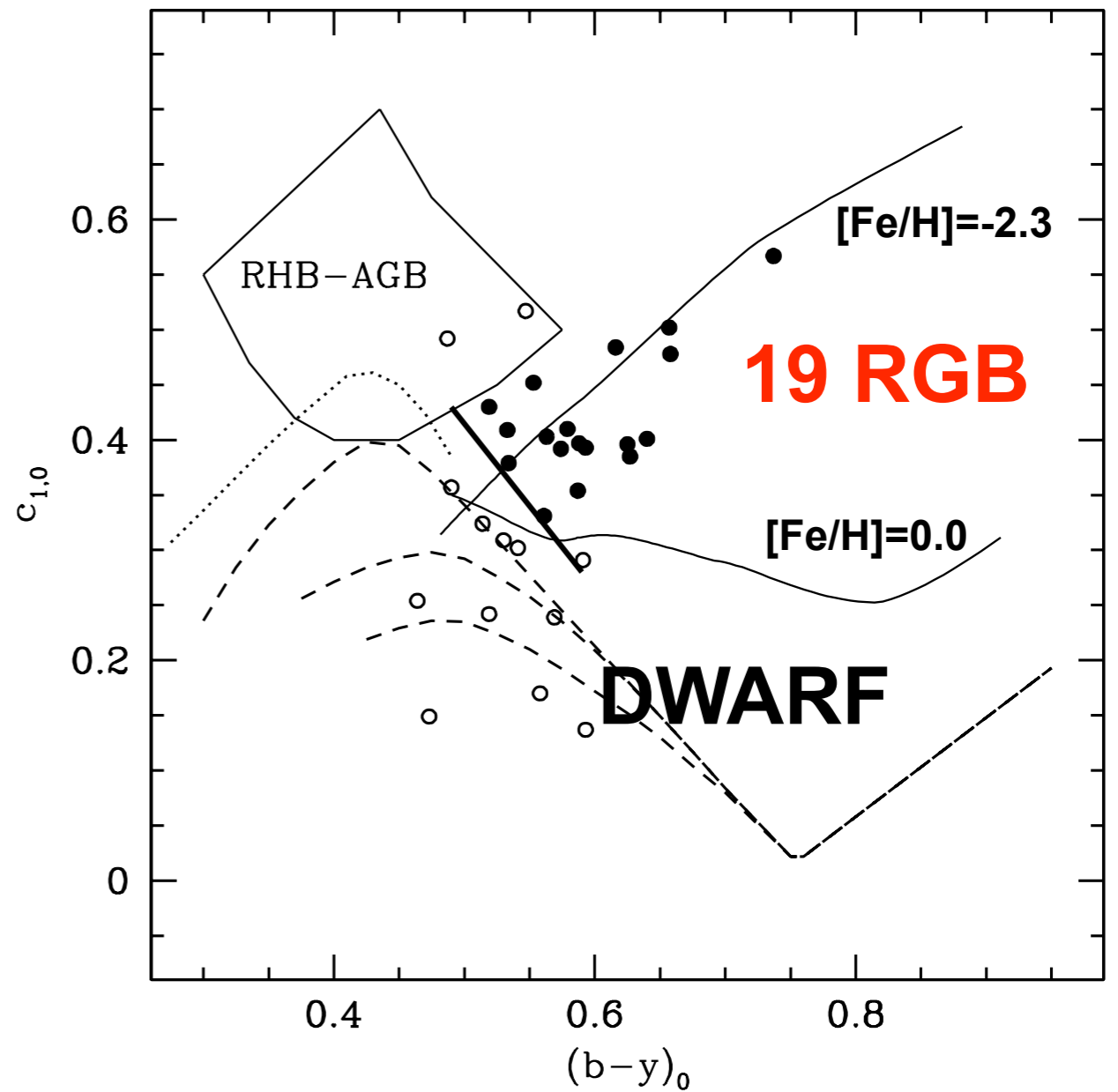


Weeding out the foreground



$$\langle v \rangle = 40.9 \pm 1.4 \text{ km s}^{-1}$$

$$\sigma_v = 7.3 \pm 1.1 \text{ km s}^{-1}$$



New Velocity Dispersion

$$\sigma_v = 3.7 \pm 0.9 \text{ km s}^{-1}$$

$$\langle v \rangle = 45.2 \pm 1.1 \text{ km s}^{-1}$$

Probability Distribution of the Galaxy Mass Within 300 pc

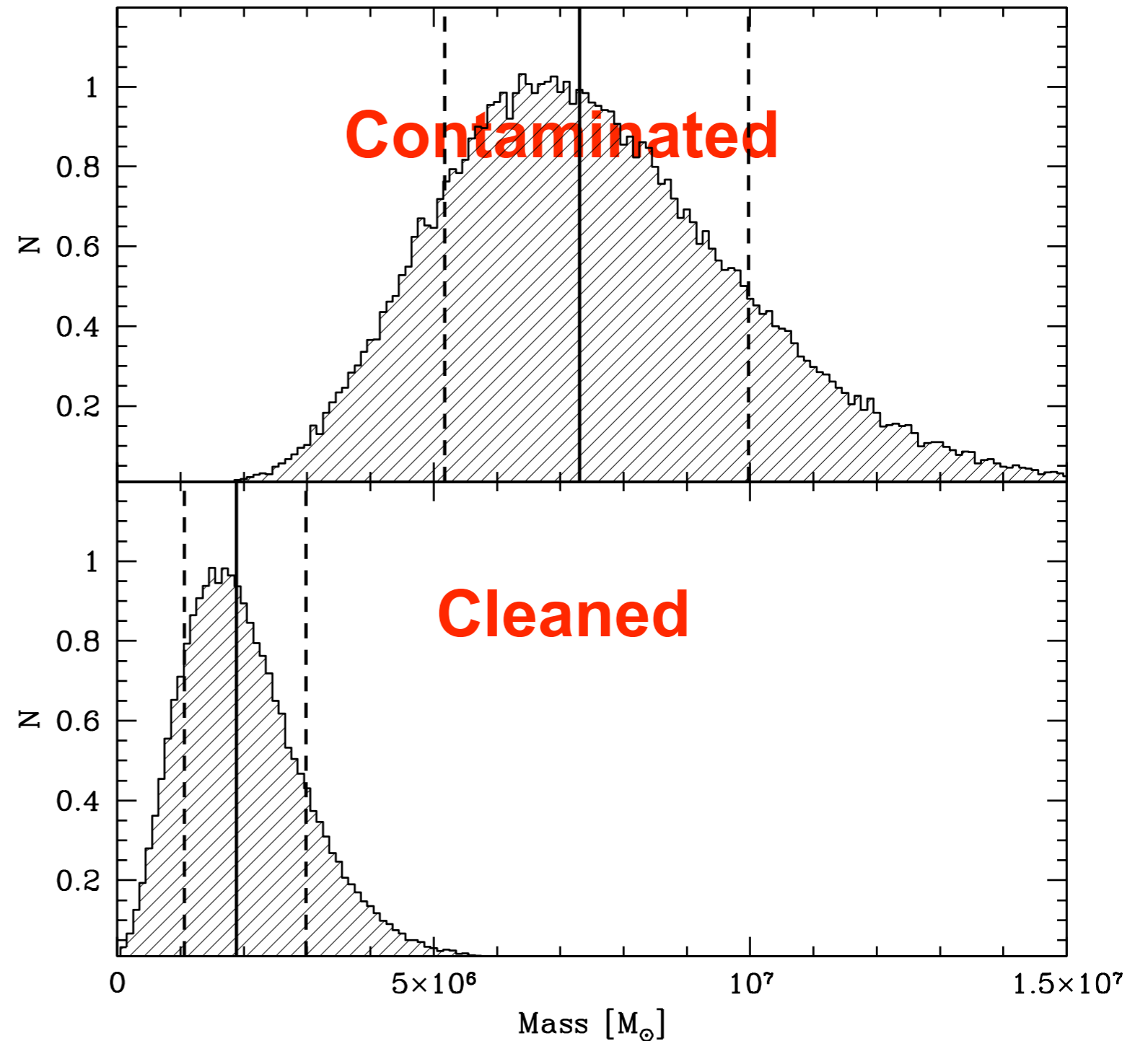
$$M(r) \propto \sigma_v^2$$

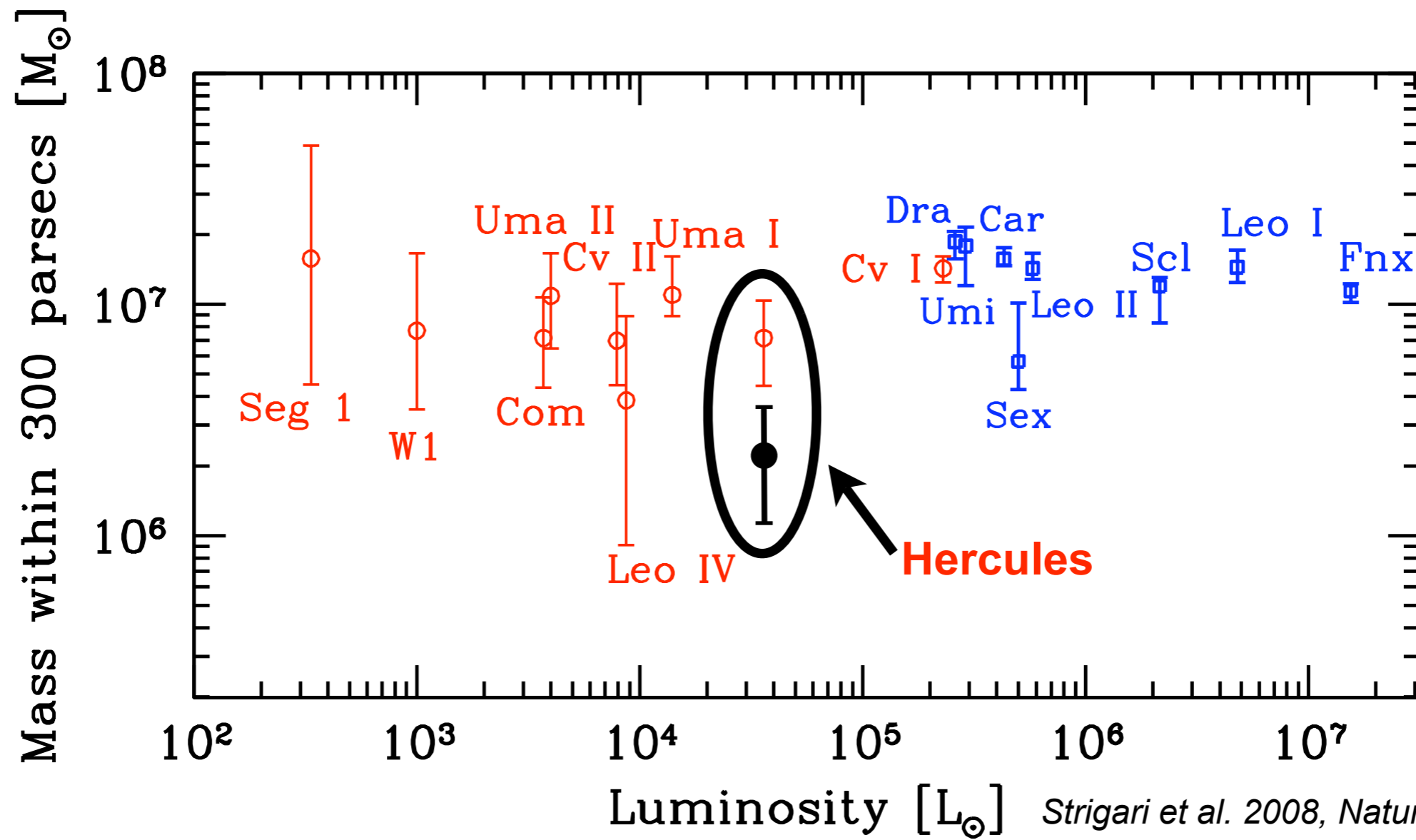
$$\sigma_v = 7.3 \text{ km s}^{-1}$$

$$M_{300pc} = 7.4_{-2.1}^{+2.6} \cdot 10^6 M_{\odot}$$

$$\sigma_v = 3.7 \text{ km s}^{-1}$$

$$M_{300pc} = 1.9_{-0.8}^{+1.1} \cdot 10^6 M_{\odot}$$



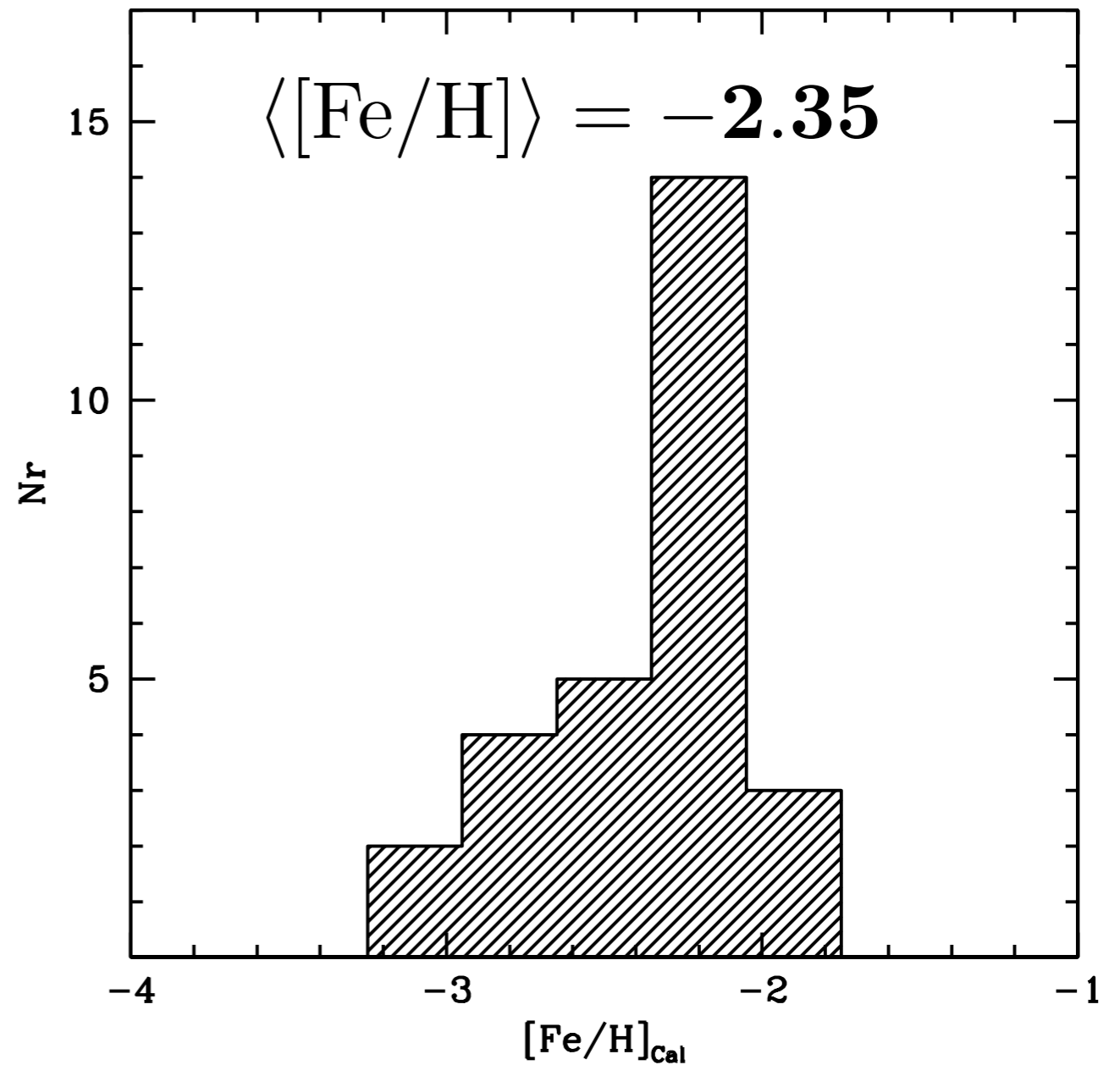
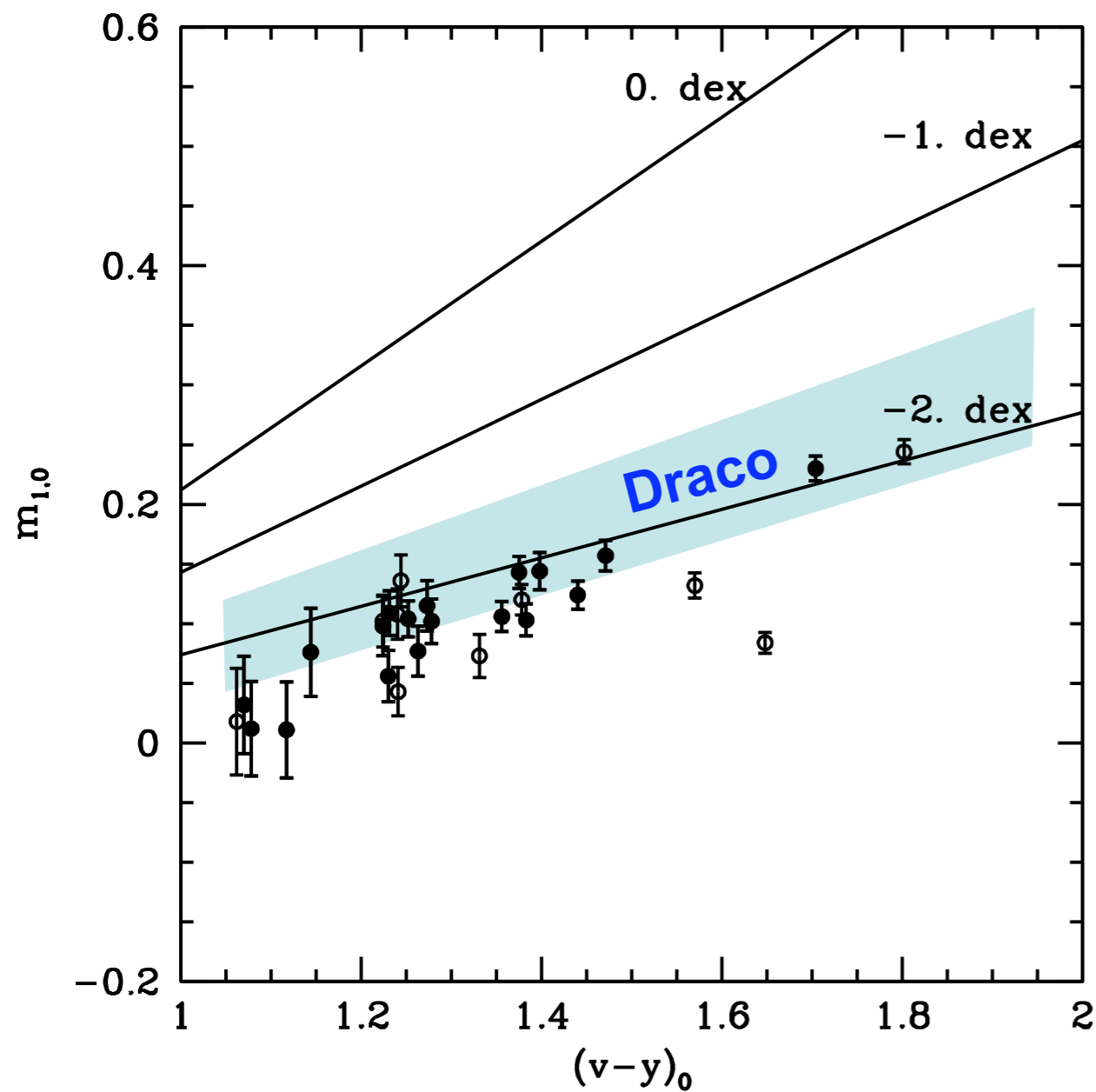


$$\sigma_v = 7.3 \text{ km s}^{-1} \longrightarrow M_{300pc} = 7.4^{+2.6}_{-2.1} \cdot 10^6 M_{\odot}$$

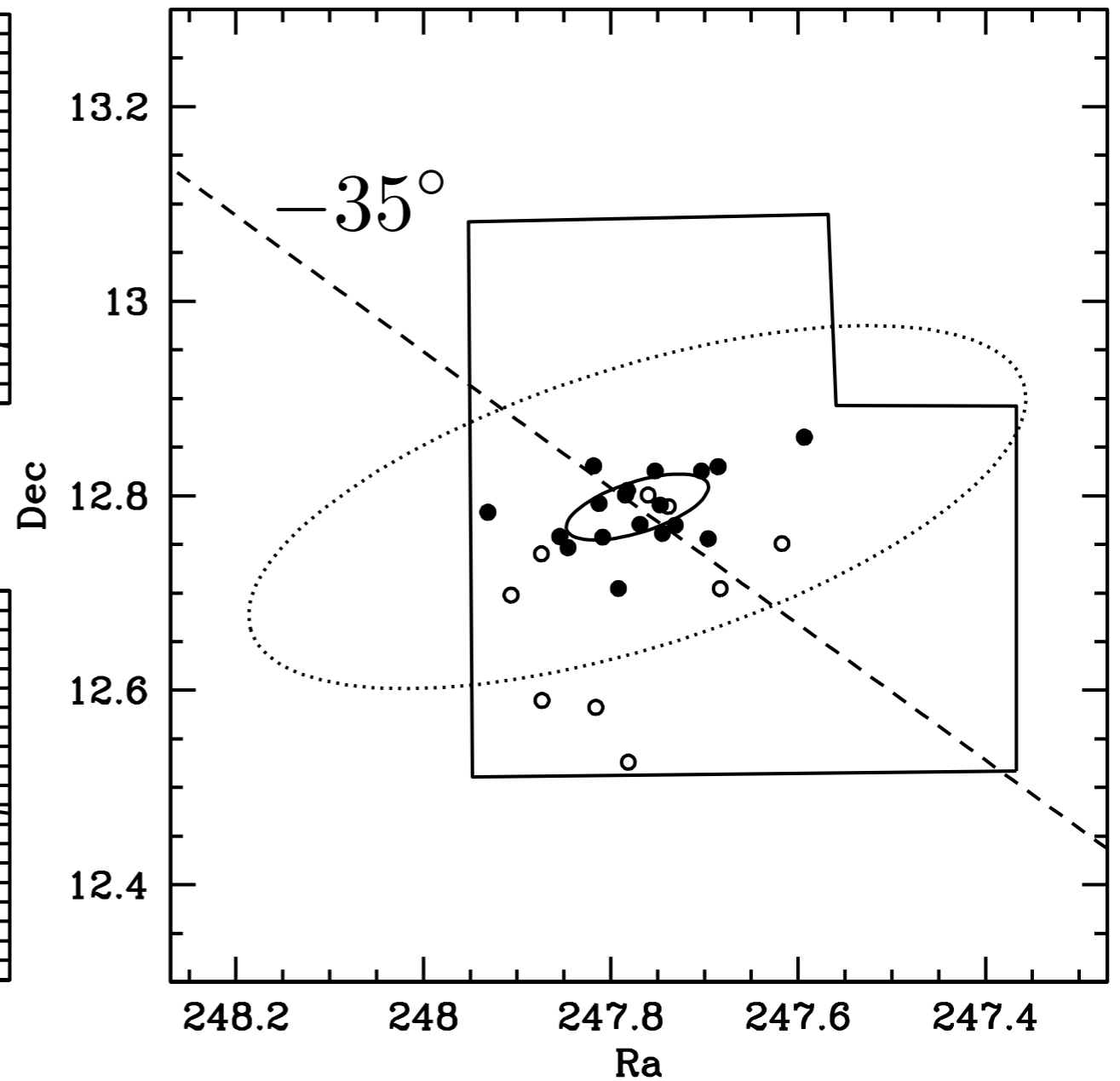
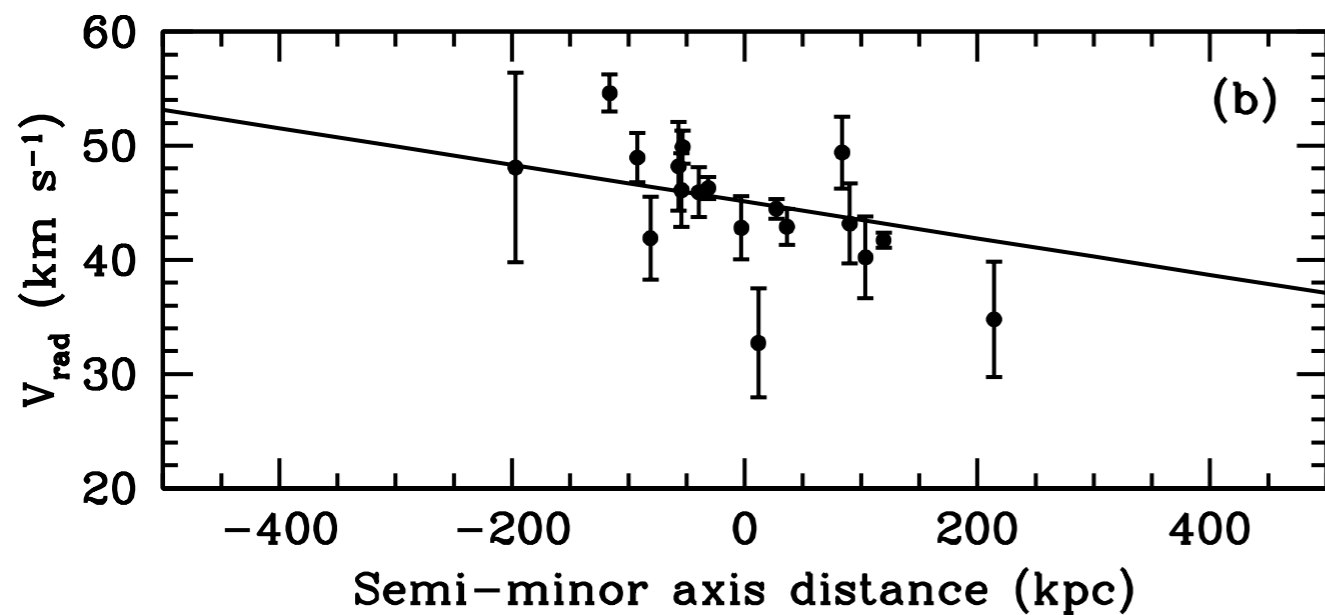
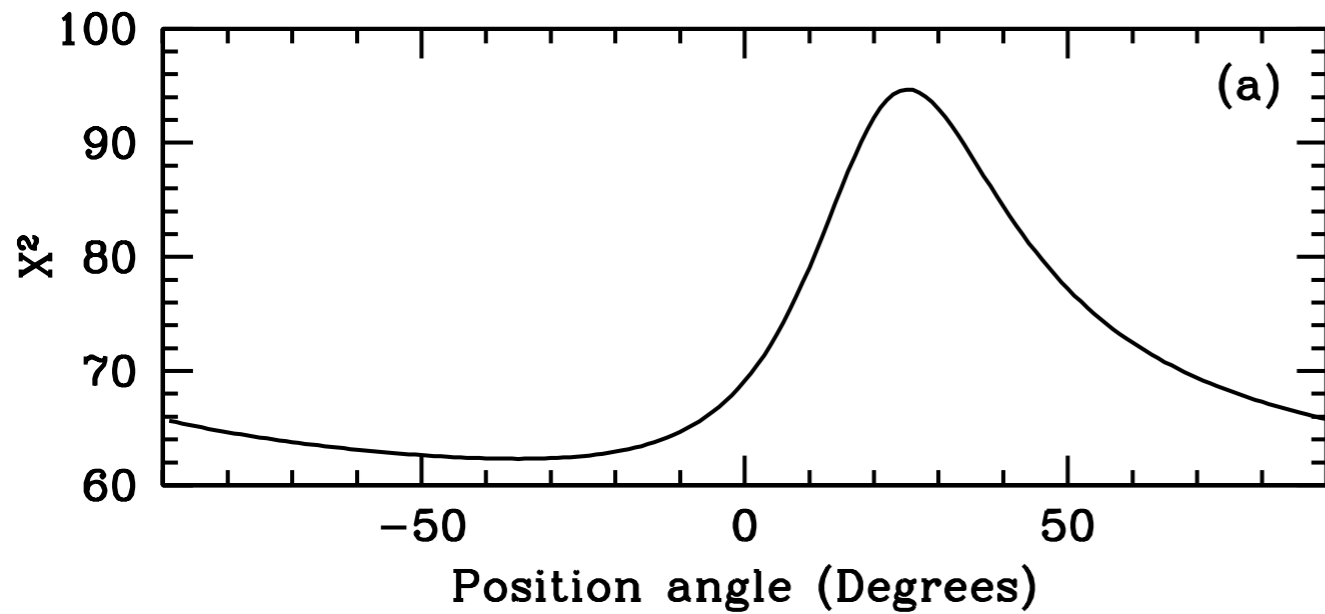
$$\sigma_v = 3.7 \text{ km s}^{-1} \longrightarrow M_{300pc} = 1.9^{+1.1}_{-0.8} \cdot 10^6 M_{\odot}$$

The metallicity of the Hercules dSph galaxy

$$m_1 = (v - b) - (b - y)$$



A velocity gradient in Hercules?



$$16 \pm 3 \text{ km s}^{-1} \text{ kpc}^{-1}$$

Summary

- Half the velocity dispersion for the cleaned RGB sample
 - $\sigma_v = 3.7 \text{ km s}^{-1}$
- Mass within 300 pc, $M_{300pc} = 1.9_{-0.8}^{+1.1} \cdot 10^6 M_{\odot}$
 - Smaller than previous study
- A mean metallicity of -2.35 dex with a large spread
- Tentative evidence for a velocity gradient $16 \pm 3 \text{ km s}^{-1} \text{ kpc}^{-1}$

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