HOW STAR CLUSTERS LOSE MASS

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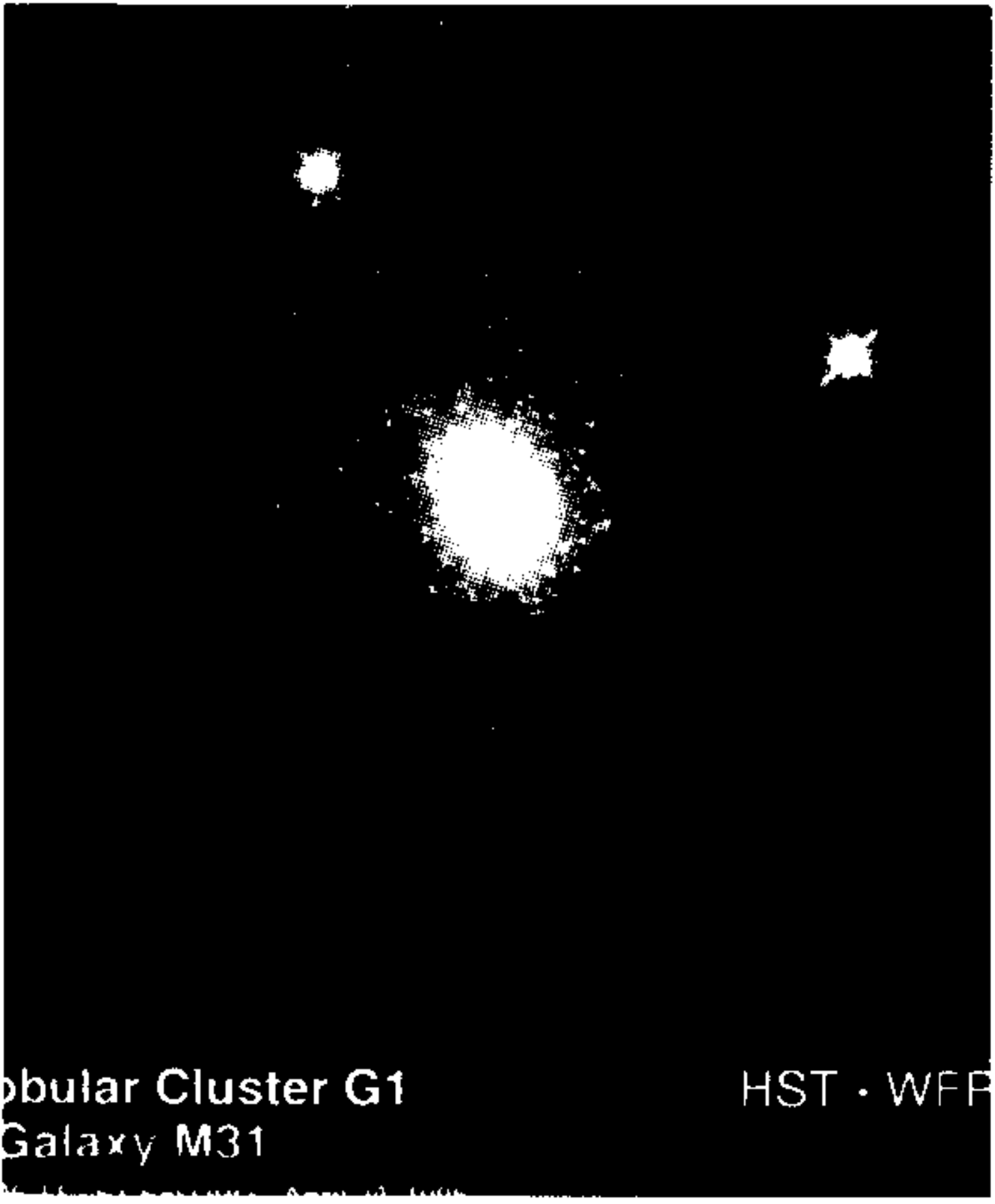
1. Observations

2. Theories

WHY STUDY MASS LOSS?

- It happens
- It affects the inferred IMF
- It governs LF of the globular cluster system
- Similar to mass loss from galactic satellites
- Contributes to stellar halo
- Scaling of N-body models


obular Cluster G1
Galaxy M31
HST · WFP

OBSERVATIONS

- Spatial data

  extratidal extensions

- Velocity data

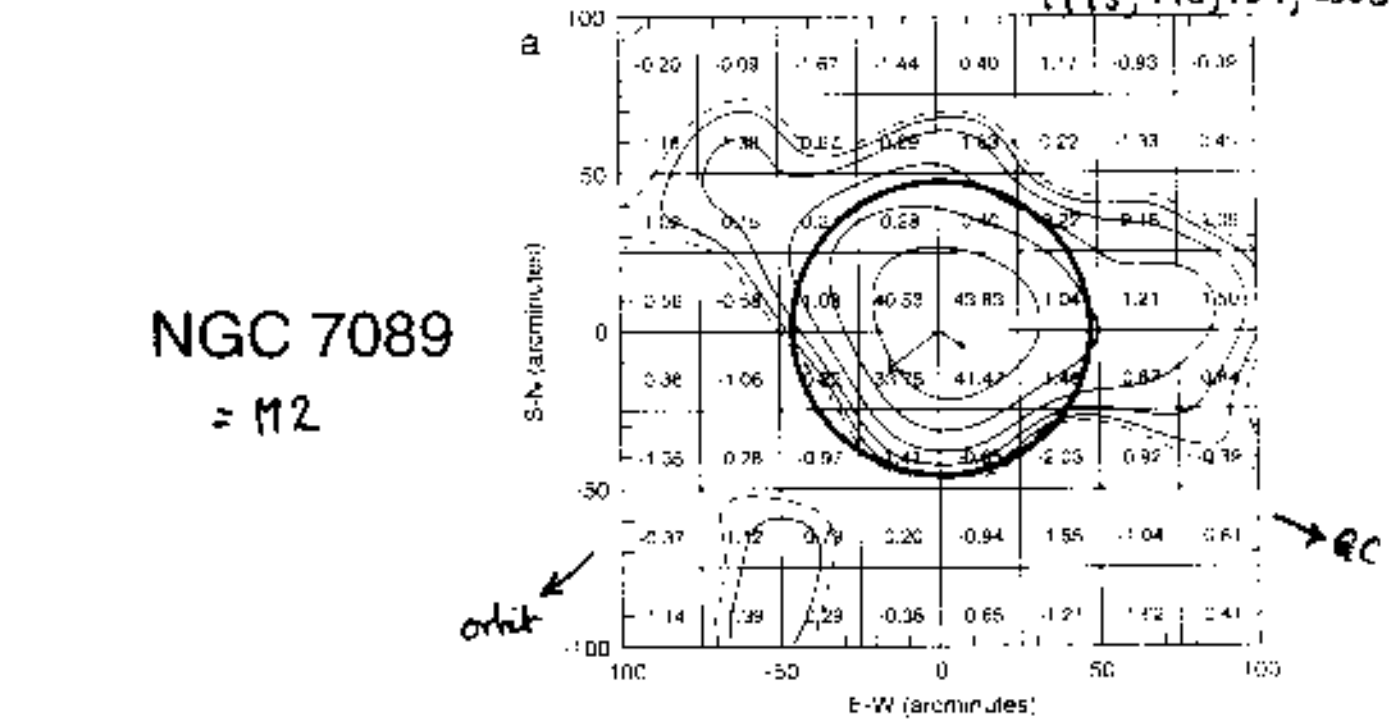
  - "Tidal Heating"
  - "Cannonballs"

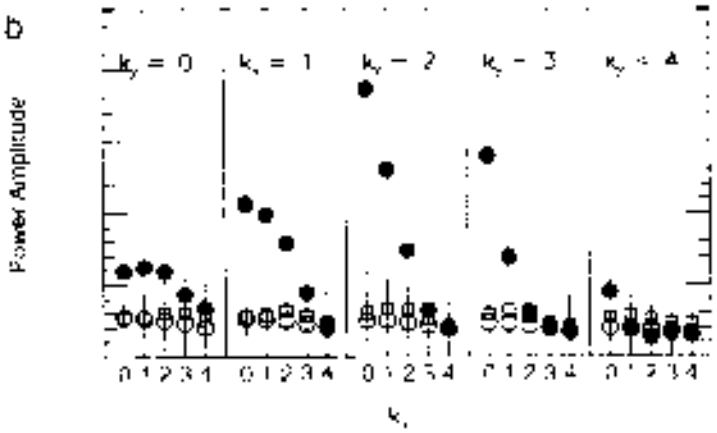
- Indirect effects

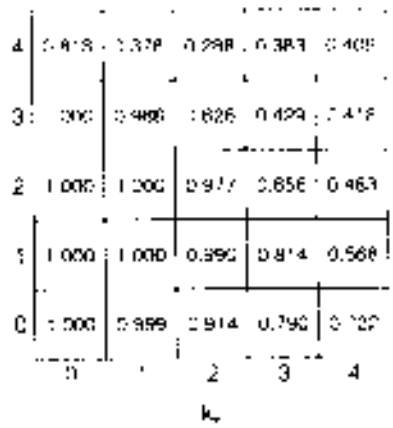
  - Stellar mass function
  - Distribution of cluster properties

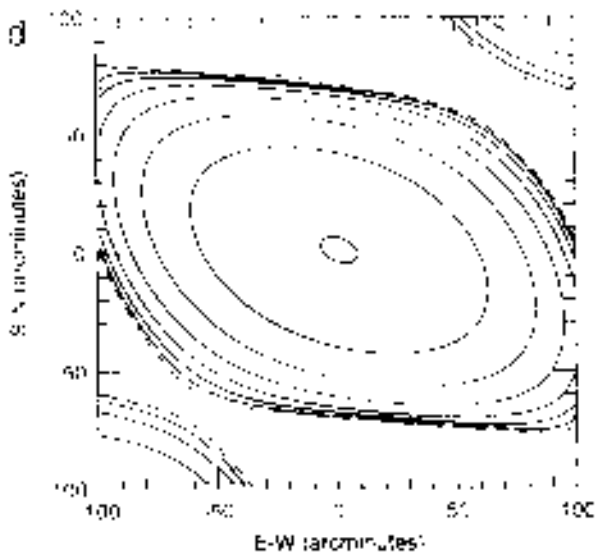
Grillmair
1995, AJ, 109, 2553

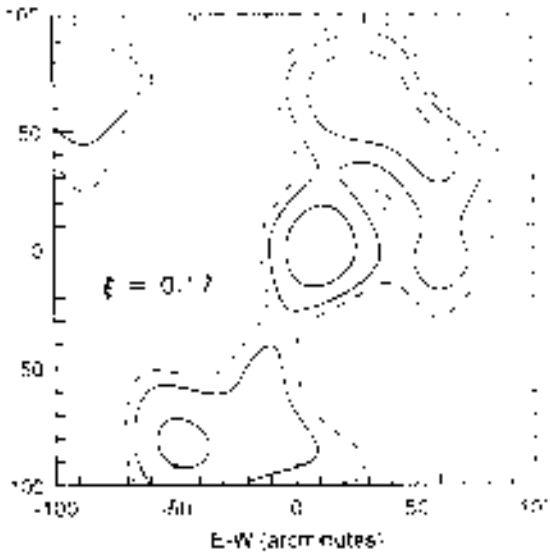
NGC 7089
= M2











cf. Johnston, Hernquist, Bolte, Figueroa astro-ph/9...
(lifetime ~ 1–5 Gyr)

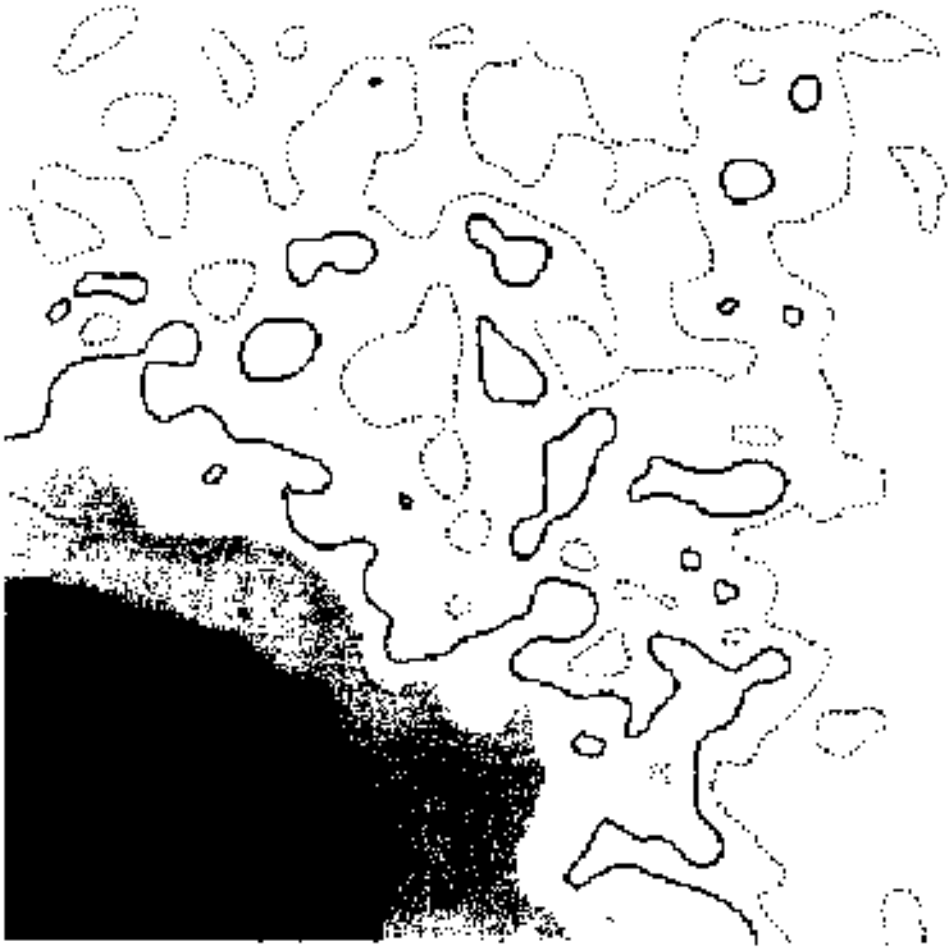


Fig. 12. Surface density map of M 55 with contour levels.

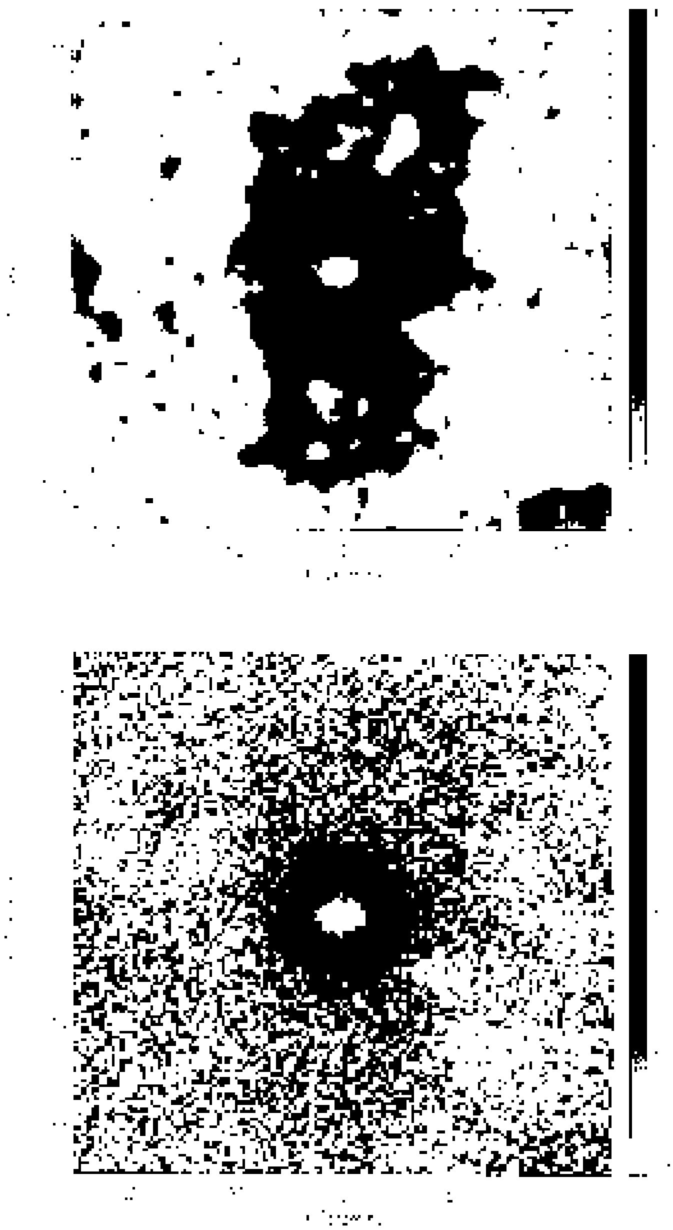
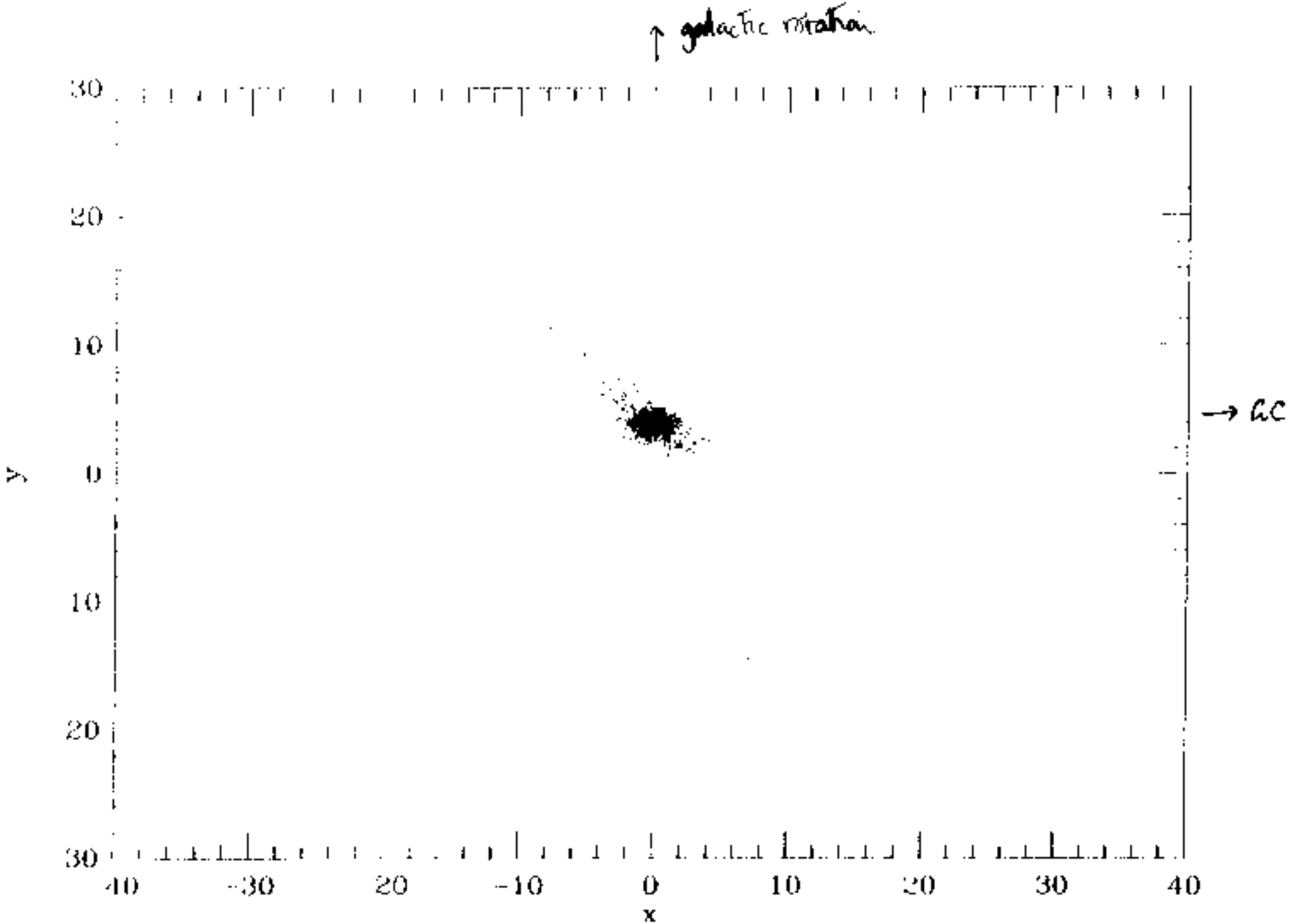
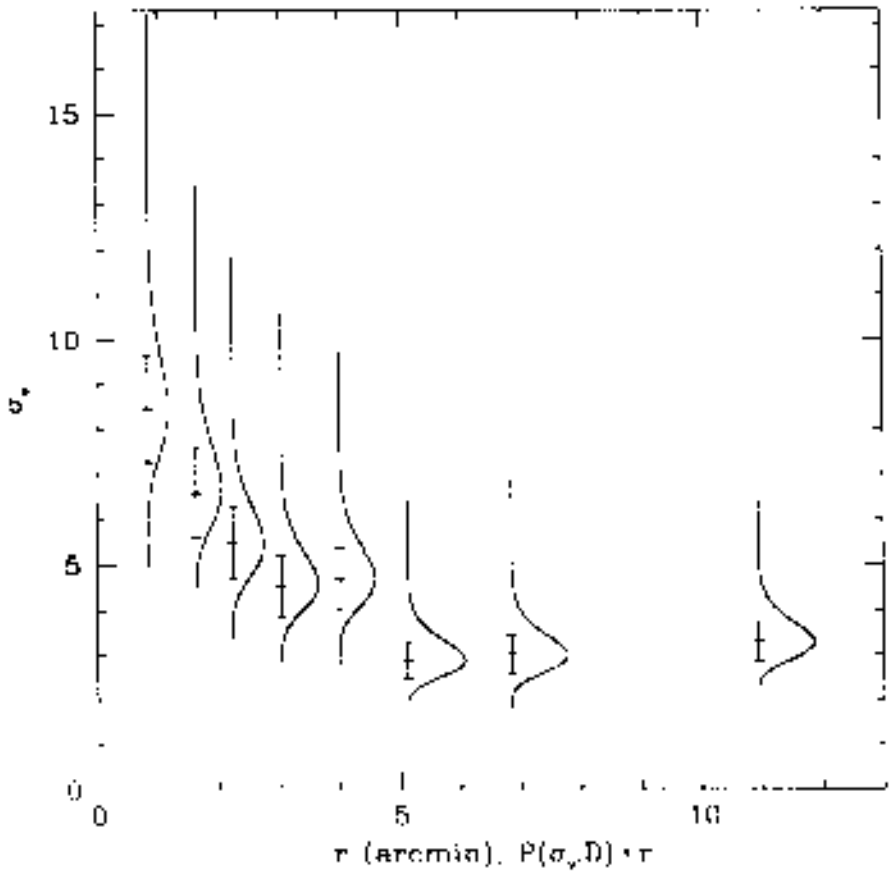


Fig. 1. NGC 5139 ≡ ω Centauri. In the upper panel, filtered image of the projected star count overdensities using the Wavelet Transform, to be compared with the raw star counts in the lower panel. The upper panel displays the full resolution, using the whole set of wavelet planes.


↑ galactic rotation
30
20
10
0
10
20
30
y
→ ac
-40
-30
20
-10
0
10
20
30
40
x

Dubias et al astro-ph 9711057 21

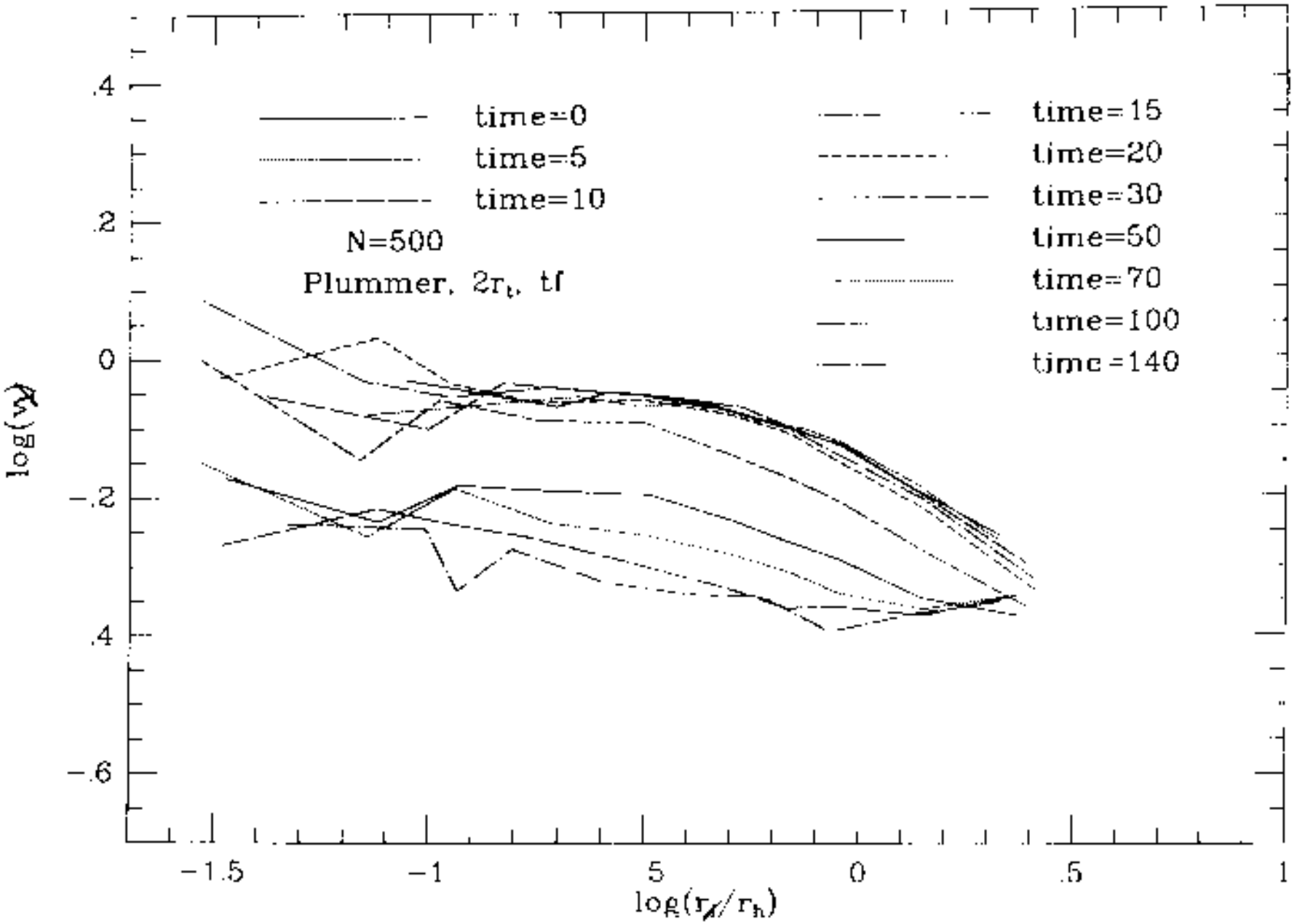


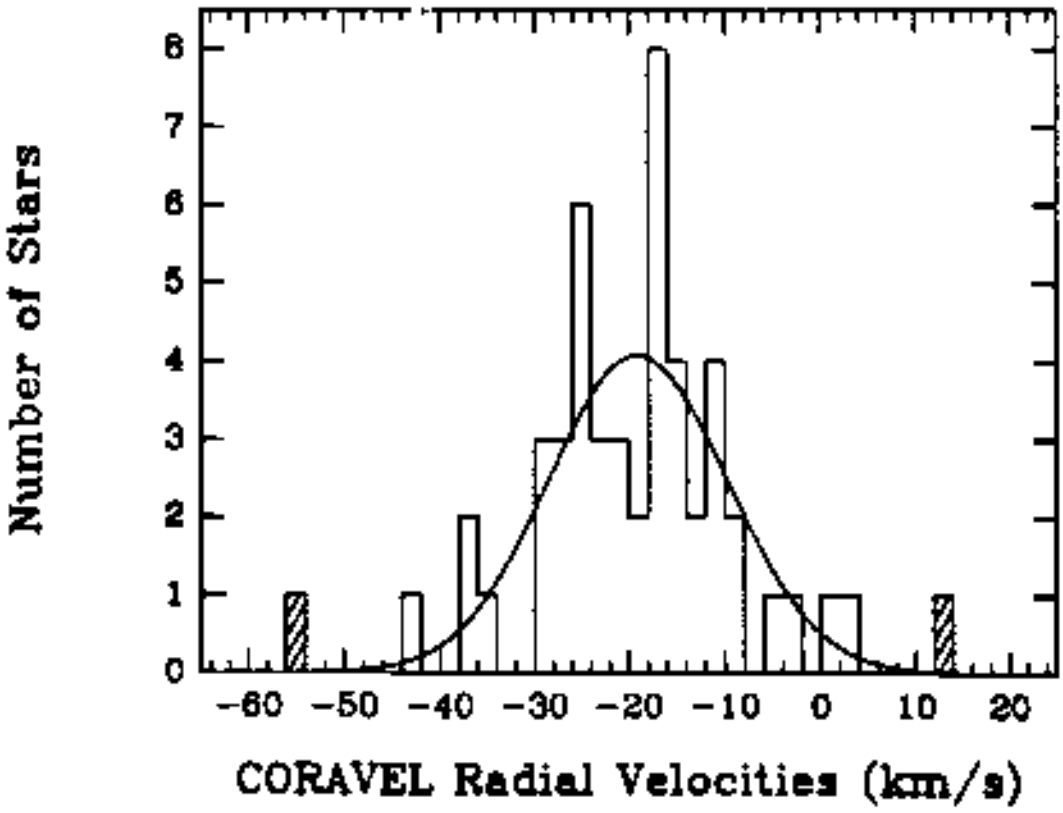
$r_c = 20'$

Fig. 11. — The inferred velocity dispersion profile assuming no rotation. The curves and points are as described in Figure 9.

Beyond this radius, the modes of the distributions increase again, confirming what is seen in the raw velocities. Since we have computed the probability distributions, it is straightforward to calculate the probability that one point is larger than another, or, alternatively, the odds. The probability that the last point is higher than the next to last is 67%, or 2:1 odds. The odds are roughly 2 to 1 in favor of the last point being higher than the next to last and roughly 4:1, the probability that the last is larger is 77% giving odds of 3 to 1. For an explanation of these odds ratios, see Bevington et al. (93, ch.). While not significant, these results do not in themselves argue strongly for an increase in the velocity dispersion.

Giersz & Heggie 97

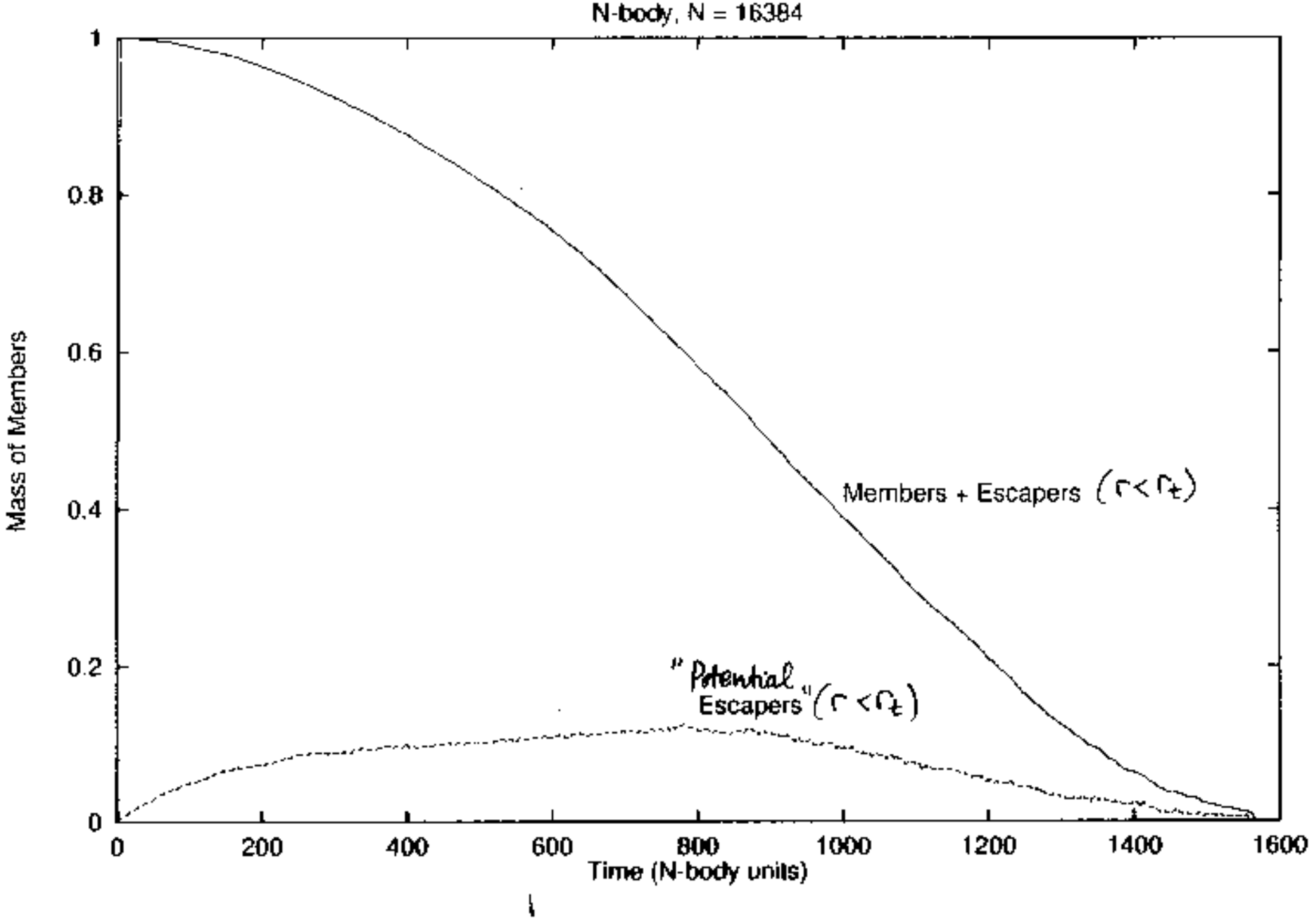




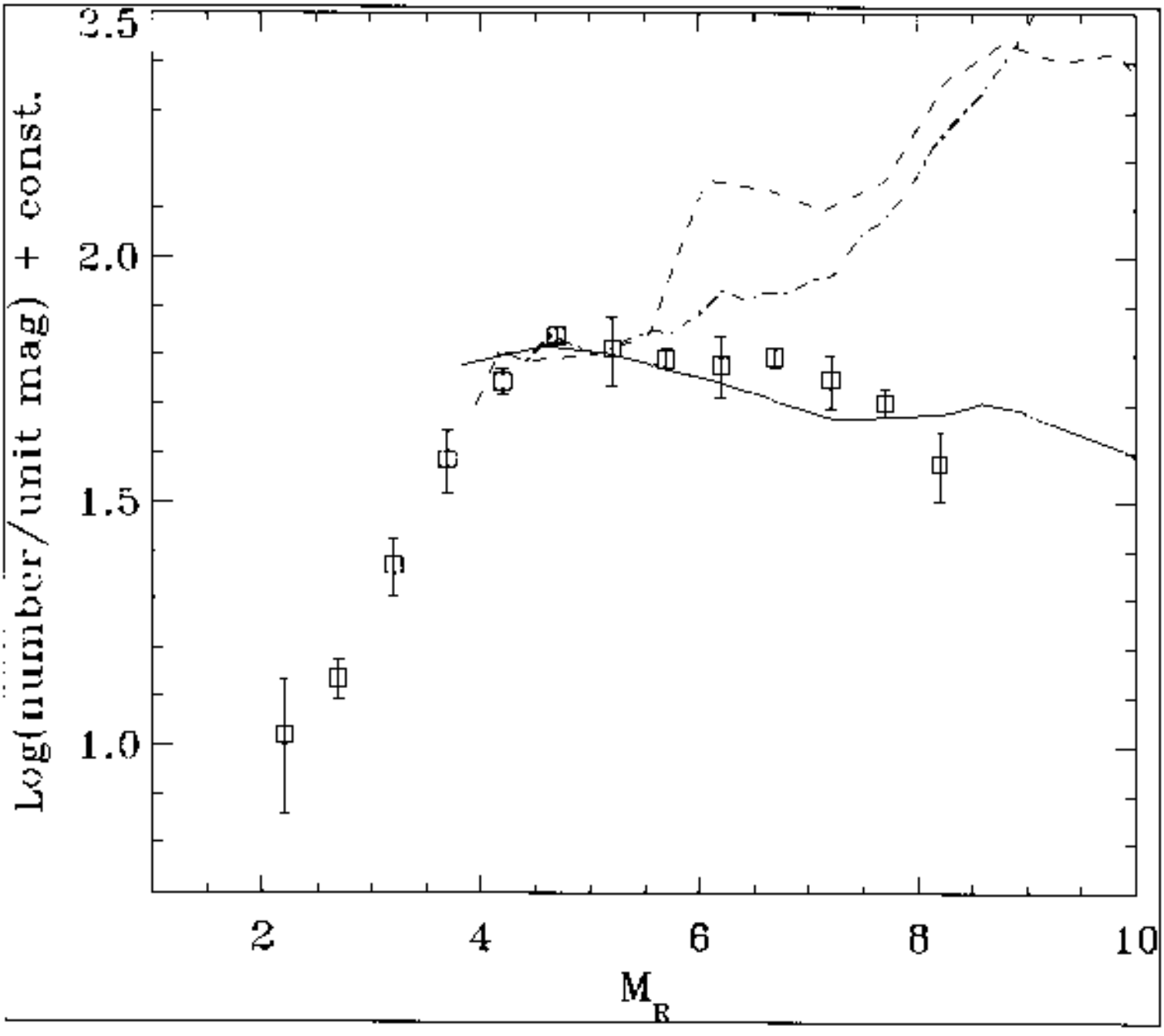
Meylan et al ApJ 383, 587

cf. C&G '79 (M3)
P46

Figure 3.—Histogram of the 56 radial velocities contained in Table 2, including the high-velocity star #74 found in CASPEC spectra and later observed with CORAVEL and the high-velocity star #10 observed with CORAVEL.


N-body, N = 16384
Mass of Members
Time (N-body units)
Members + Escapers (r < r_t)
"Potential Escapers" (r < r_t)
0
0.2
0.4
0.6
0.8
1
0
200
400
600
800
1000
1200
1400
1600

de Marchi et al. 1999 A&A 343, L7



Bruguès et al.