The Halos and Environments of Nearby Galaxies (HERON) project

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NGC 3628
Deep HST fields in the M31 show age range

Brow et al. 2006

Disk

Spheroid
KINEMATIC AND CHEMICAL CONSTRAINTS ON THE FORMATION OF M31'S INNER AND OUTER HALO


Received 2007 November 4; accepted 2008 August 4

[Fe/H from coadded Ca IR triplet
All groups now agree -2 at 100 kpc
Background: Advances in commercial imagers lead to a revolution

Martinez-Delgado (2010)

Francis Longstaff, UCLA Anderson
The Centurion 28-inch
designed and built by James Riffle
(see Brosch et al. 2016)

Prime focus
f/3.2 Hyperbolic primary
2 element Ross Corrector
SBIG STL 11000 at prime focus
Luminance (wide R) filter
Located at private site near Frazier Park, CA
Site, 5300 ft elevation, 21.7 – 22.3 mag/sq” at zenith

**Remotely operated** with data upload to Carbonite
Maxim DL (data acquisition, tracking)
The Sky version 6 (telescope control)
Focusmax (focus control);
innovations include protection interlock against roof closure. Data pipeline for reductions.

Currently using FLI09000 imager on loan from ASU
Luminance (4000-7000A), sdss g, r  NII+Halpha available

Operations cost ~$1,500 /yr
All collaboration on voluntary basis- NO FUNDING ALLOCATED
HERON 28-inch Lockwood Valley 12x300s
Luminance = 4000-7000A wide R

Irida Observatory 12” astrograph
21.5 hours

3.6m CFHT SDSS g 0.7 h
Figure 1. A comparison between our image of M51 using the C28 and SBIG11000m imager for $12 \times 300$ sec (left) and that published by Watkins et al. (2015) using a Washington B band exposure of $31 \times 1200$ sec (roughly 10 h) using the 24/36-inch Burrell Schmidt at Kitt Peak (right). Two completely independent approaches to deep imaging are reaching similar depths and revealing similar low surface brightness morphology. This result also addresses concerns that wide angle, faint scattered light might affect our measurements. Both figures show a limiting surface brightness of $\sim 30$ mag/arcsec$^2$. 
Nucleated dwarf companion NGC 7331

Tidal stream 4×16 kpc

Heidelberg 2 July 2018
35 Hours Dragonfly SDSS r
(8 lenses)

vs 40 min C28
Comparison with Kormendy et al. 09
Survey of 123 nearby Galaxies, primary selection from 2MASS nearby galaxy survey (Jarrett et al. 2003)
Halo diameter defined as largest major axis not including interaction streams or shells. Distances from Cosmicflows3

No trend with V mag indicates scattered light not a factor.
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New Result: Diameter-$M_v$ correlation
Break was seen in halo properties by luminosity/[Fe/H]

Mouhcine, Rich et al. 2005
Interactions across the color-magnitude diagram
Largest halos are on the red sequence
Are the outer parts of spirals dominated by classical halo population II?

Or by the debris of the disk and perhaps the interacting galaxy?
Diameters of Face on spirals smaller than edge on.
Extended spiral structure

N 1084

N 2903

N 3351

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Extended halos structure

N 1084

N 2903

N 3351

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Extended spiral structure

N 1084

N 2903

N 3351

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Wise Observatory, Tel Aviv University

Fully robotic schedulable 0.7m telescope
HERON survey conclusions

1. Correlation between diameter and $M_v$
2. Largest halos found $M_v < -21$
3. Ellipticals have the largest halo diameters
4. Largest halos are on bright end of red sequence
5. The most extended light in face-on spirals may be disk or disturbed disk/debris light.