*RevMexAA (Serie de Conferencias)*, **17**, 46–46 (2003)

# STARS AS A TRACER OF THE SHAPE OF IRREGULAR GALAXIES' HALOES

Igor Drozdovsky[1,2], Nikolay Tikhonov[3] and Regina Schulte-Ladbeck[1]

**Too little is known about the outskirts of dwarf galaxies. The presence of red extra light ("background sheet") outside of the main galaxy body and the spatial distribution of resolved old stellar populations suggest that irregular galaxies might have similar outer structures to spirals, consisting primarily of late-type stars out to large galactocentric radii. Further investigation of this claim is critical in constraining the origin and evolution of galaxies and the nature of dark matter halos. We present the preliminary results of our study of nearby irregulars** in order to:

- Separate different stellar populations, on the basis of analyzing of derived color-magnitude diagrams
- constrain their spatial geometry (scale lengths, surface brightness, elongation, thin-to-thick disks ratios), and
- determine the connection between underlying stellar population and the host galaxy structure,

*Selection of Objects for the Study.* All data are archival and were obtained with HST/WFPC2. Target galaxies were chosen based on the following criteria:
1. A distance of $\leq$ 5-6 Mpc, so that the red giant population may be well resolved.
2. Rotational velocities $< 75$ km/s. This selects irregular galaxies.
3. Axis ratio, $a/b < 1.2$, (or viewing angle $i < 30$ deg) for the 'face-on' irregulars, or $a/b > 2.3$ (viewing angle $i > 60$ deg) for the 'edge-on' systems.
4. Small angular size (at least along one galactic axis) to see the outer part of the galaxy.

We compiled for our study the list of fifty galaxies, designed to produce a homogeneous data base for studying halo stellar populations. Unlike the original investigators of those programs, we plan to make use in our study of the lower luminosity, outer parts which often escape attention because of the centrally located active star formation in these galaxies.

*Preliminary results.* All the nearby dIrs show evidence for an old ($\sim 1 - 15$ Gyr) star formation activity. Averaged over time intervals large enough (a few Gyr for the oldest stars) they show a decreasing SFR, a larger fraction of their stars having been formed during the first half of their lives than during the second.

Most of the galaxies show a pronounced luminosity excess above the best-fitting exponential at large radii, or surface brightnesses fainter than 26 mag/$\square''$ in $R$. Together with increasing a galaxy color along the galactocentric radii, this feature might be an indication of the existence of an extended old stellar halo in dIrrs.

Some of the color-magnitude diagram of dIrrs confirm this two component (core-halo) morphology: an inner high surface-brightness young population, and a relatively low surface-brightness intermediate-age old population extending out to large radius. For some of the galaxies it goes almost as far as their radio sizes (e.g. IC10). Pegasus dIrr has a stellar disk more extended than the radio one.

All the studied galaxies do not show the presence of spherical stellar halo, but all have thin and thick disks. The thin-to-thick disks size ratio is about 1:3.

No clear evidence for the changing of stellar metallicity along the galactocentric radii of dIrrs was found.

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[1]Dept. Physics & Astronomy, University of Pittsburgh, 3941 O'Hara St., Pittsburgh, PA 15260, USA
[2]Astronomical Institute, St.Petersburg State University, Russia
[3]Special Astrophysical Observatory, Russia



Galaxy Evolution: Theory and Observations (Cozumel, Quintana Roo, México, 8-12 April 2002)
Editors: Vladimir Avila-Reese, Claudio Firmani, Carlos S. Frenk & Christine Allen