Low surface brightness galaxies (LSBs) are the most common type of galaxy in the local universe. They are characterized by their low surface brightness, making them appear mostly dark and featureless in traditional images. However, the study of LSBs has become increasingly important due to their unique properties and the insights they provide into galaxy evolution and the physical conditions of their environments.

Our Observations

- **Technique:** University of Arizona Steward Observatory (USAO) 12m telescope.
- **Date:** 2001, February 18 to 22.
- **Targets:** We targeted the positions given by O'Neil, Hofner, and Schinnerer (2000) for N09-2, N10-4, and P06-1 and P06-4 (1987) in 68-6173 (See Table 1).
- **Frequencies and Bandwidths:** Our sensitivity was centered on the CO (3–1) transition (redshift about 1080 km/s).
- **Observations:** We only observed the CO (3–1) transition because the necessary components (3–1) transition were too faint.
- **Detections:** Each receiver was pointed to a 2° thick disk (within a 1.5° bandwidth at 10 km/s resolution) in 3–1, 1–0, and 2–1 transitions of CO.

Data Reduction

- **Final Product:** A 2D mosaic of 8 pointings.
- **Reduction:** Each 8 point source was fit with a linear baseline and a polynomial function to obtain the velocity channel of the previously observed channel.
- **Asymmetry:** The asymmetry for each object was produced from the channel maps.
- **Upper Limits:** For each object, we estimated the upper limits for CO (3–1).

Conclusions

- **Our method of selecting LSBs likely to have detectable molecular gas content is unimportant due to the lack of detections.**
- **Gibbs, Swaters, & McGaugh (1999) studied the ISM in galaxies as a function of surface brightness, metallicity, and density structures.**
- **Our surface brightness cut of 25 to 28 mag arcsec$^{-2}$ is slightly lower than the optical cut of 22.**

LSBs with red CO 1–0 colors are likely to have extremely red B–V colors and thus potentially higher metallicities and molecular gas content.

P06-1: How’d We Miss It?

- **The most likely reason for our non-detection of P06-1 is the fact that we didn’t go deep enough.**
- **O’Neil, Hofner, & Schinnerer (2000) detected CO in a subset of LSBs.**
- **Schombert, J. (1986) found that the value of δ for LSBs is not as extended in LSBs as in HSIs spirals.**

Table 1: The Observed LSBs

<table>
<thead>
<tr>
<th>Name</th>
<th>RA (J2000)</th>
<th>DEC (J2000)</th>
<th>z</th>
<th>M$_{HI}$ (10$^{14}$ Msolar)</th>
<th>M$_{H_2}$ (10$^{10}$ Msolar)</th>
<th>M$<em>{HI}$/M$</em>{H_2}$</th>
<th>P06-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>P06-1</td>
<td>23:23:32.6</td>
<td>8:37:25.0</td>
<td>0.014</td>
<td>0.027 Jy</td>
<td>0.548 Jy</td>
<td>7.41</td>
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<tr>
<td>N09-2</td>
<td>10:20:21.9</td>
<td>28:07:54.0</td>
<td>0.18</td>
<td>0.014 Jy</td>
<td>0.276 Jy</td>
<td>1.73</td>
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<tr>
<td>N10-4</td>
<td>11:58:52.2</td>
<td>20:58:39.0</td>
<td>0.23</td>
<td>0.014 Jy</td>
<td>0.276 Jy</td>
<td>9.78</td>
<td></td>
</tr>
<tr>
<td>N10-5</td>
<td>11:58:52.2</td>
<td>20:58:39.0</td>
<td>0.23</td>
<td>0.014 Jy</td>
<td>0.276 Jy</td>
<td>9.78</td>
<td></td>
</tr>
</tbody>
</table>

Note: See Schombert (1986).