ESO 546-G34: The most metal poor LSB galaxy?

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ABSTRACT
We present a re-analysis of spectroscopic data for 23 H ii-regions in 12 blue, metal-poor low surface brightness galaxies (LSBGs) taking advantage of recent developments in calibrating strong-line methods. In doing so we have identified a galaxy (ESO 546-G34) which may be the most metal-poor LSB galaxy found in the local Universe. Furthermore, we see evidence that blue metal-poor LSBGs, together with blue compact galaxies (BCGs) and many other H ii galaxies, fall outside the regular luminosity-metallicity relation. This suggests there might be an evolutionary connection between LSBGs and BCGs. In such case, several very metal-poor LSBGs should exist in the local Universe.

Key words: ISM: abundances, H ii regions – Galaxies: dwarf, individual: ESO 546-G34

1 INTRODUCTION
Among blue metal-poor low surface brightness galaxies (LSBGs) one may very well find the most unevolved objects in the low-z Universe (Bothun et al. 1990, Lacey & Silk 1991). LSBGs investigated by Rönneback & Bergvall (1994, 1995) as well as those studied by de Blok, McGaugh & van der Hulst (1996) tend to be bluer than most other galaxies of the same type. However, the wide range of colours and metallicities, from very blue and metal-poor to very red and relatively metal-rich, suggests that LSBGs also have a wide range of evolutionary states, just like their high surface brightness (HSB) counterparts (Mattsson, Caldwell & Bergvall 2008; Liang et al 2010). It is then natural to assume that blue LSB galaxies are young and unevolved and red LSB galaxies are old and evolved, especially since the blue ones appear metal poor and the red ones quite metal rich (McGaugh 1994, Kuzio de Naray, McGaugh & de Blok 2004).

A simple and attractive explanation for the LSB property is that LSBGs are simply forming stars very inefficiently (Bothun et al. 1990, Boissier 2008). This inefficiency may reflect lower star-formation rates in the star-forming regions in general, or a star formation threshold leading to fewer star-forming regions, i.e., a lower star formation density in total (see, e.g., Kennicutt 1989, van der Hulst et al. 1993). This picture is also very much consistent with the rather high gas mass fractions found in LSBGs (see, e.g. Kuzio de Naray, McGaugh & de Blok 2004, and references therein). If this hypothesis for the LSB property holds true, a direct consequence would be that blue LSBGs are very unevolved objects and some of them may have extremely low metallicities.

It is often difficult to detect the O iii]4363-line in LSBGs and hence impossible to use a 'direct' method (based on the electron temperature T_e) to derive abundances. This suggests there might exist extremely metal-poor LSBGs which have not been labelled as such, since a T_e-based method could not be used and existing strong-line calibrations are not made for the very metal-poor regime or at best give very uncertain results.

In this letter we reanalyse, in the light of recent developments in calibrating strong-line methods of high-precision (Pilyugin & Mattsson 2011; Pilyugin, Vílchez & Thuan 2010), a sample of blue unevolved LSBGs observed spectroscopically by Rönneback & Bergvall (1995). Our results indicate that one of the expected extremely metal-poor LSBGs is present in our sample. We also compare the rederived LSB abundances to the abundances of metal-poor BCGs and H ii galaxies.

2 ABUNDANCE DERIVATIONS
Abundances are derived either 'directly' by estimating the electron temperature from oxygen emission lines and then computing abundance ratios from the relative strength of the corresponding emission lines together with correction factors for the degree of ionisation, or by using calibrated relations between strong-line fluxes and atomic abundances. When describing the methods below, and in further discussions in this paper, we will be using the following notations for the strong-line indices,

\[
\begin{align*}
R_1 &= \frac{[O \, iii]4363}{H_\beta}, \\
R_2 &= \frac{[O \, iii]4372 + 4379}{H_\beta}, \\
N_2 &= \frac{[N \, ii]6548 + 6584}{H_\beta}, \\
S_2 &= \frac{[S \, ii]6717 + 6731}{H_\beta}, \\
R_3 &= \frac{[O \, iii]4959 + 5007}{H_\beta}.
\end{align*}
\]

We derive abundances for 23 H ii-regions in LSBGs from the Rönneback & Bergvall (1995) LSB sample where sulfur and nitrogen lines were detected. The N_2 and S_2 indices (see Table 1)
Table 1. Strong-line indices and Hβ fluxes for the 23 H ii-regions in this study.

| Object     | R2   | R3   | N2   | S2   | I(Hβ) \times 10^{19} [W/m^2] |
|------------|------|------|------|------|-------------------------------|
| 146G14B    | 2.23 | 3.52 | 0.146 | 0.430 | 6.59                          |
| 146G14C    | 3.26 | 3.56 | 0.200 | 0.620 | 21.0                          |
| 489G56A    | 0.74 | 4.51 | 0.044 | 0.138 | 5.90                          |
| 489G56B    | 1.26 | 1.88 | 0.106 | 0.295 | 2.44                          |
| 505G04A    | 3.06 | 2.90 | 0.153 | 0.523 | 9.13                          |
| 505G04B    | 2.89 | 3.06 | 0.170 | 0.498 | 8.89                          |
| 546G34A    | 1.79 | 2.20 | 0.062 | 0.304 | 3.83                          |
| 546G34B    | 1.81 | 1.45 | 0.069 | 0.286 | 2.82                          |
| 462G22     | 2.94 | 2.71 | 0.203 | 0.588 | 1.36                          |
| 546G09     | 2.25 | 4.00 | 0.189 | 0.483 | 8.12                          |
| 158G15A    | 2.13 | 6.16 | 0.124 | 0.305 | 104                           |
| 158G15B    | 3.92 | 3.67 | 0.062 | 0.506 | 32.4                          |
| 359G31A    | 2.79 | 3.38 | 0.252 | 0.646 | 1.55                          |
| 359G31B    | 3.27 | 2.67 | 0.323 | 0.655 | 8.35                          |
| 576G59A    | 2.35 | 4.33 | 0.165 | 0.361 | 13.2                          |
| 576G59B    | 1.76 | 5.04 | 0.105 | 0.396 | 11.9                          |
| 114G07A    | 1.19 | 6.79 | 0.086 | 0.234 | 107                           |
| 114G07C    | 1.29 | 6.82 | 0.070 | 0.229 | 43.6                          |
| 405G06A    | 3.45 | 2.90 | 0.244 | 0.730 | 6.88                          |
| 405G06B    | 4.00 | 2.40 | 0.265 | 0.647 | 1.43                          |
| 405G06C    | 1.85 | 6.21 | 0.093 | 0.238 | 5.36                          |
| 504G10A    | 3.10 | 3.02 | 0.291 | 0.721 | 1.32                          |
| 504G10B    | 2.25 | 4.92 | 0.174 | 0.402 | 2.83                          |

can then be used to estimate abundances and electron temperatures. We use the 'NS-calibration' by [Pilyugin & Mattsson (2011)] and the 'ON-calibration' by [Pilyugin, Vílchez & Thuan (2010)]. More precisely, we derive abundances using relations of the form

\[
12 + \log \left( \frac{X}{H} \right)_{\text{NS}} = a_0 + a_1 \log R_2 + a_2 \log N_2 + a_3 \log \frac{N_2}{S_2},
\]

and

\[
12 + \log \left( \frac{X}{H} \right)_{\text{ON}} = a_0 + a_1 \log R_3 + a_2 \log R_2 + a_3 \log \frac{N_2}{R_2},
\]

respectively, where the coefficients \(a_i\) are fitting parameters obtained using a "calibration sample" of local galaxies with well-measured \(T_e\)-based abundances in their H ii-regions (see Pilyugin, Vílchez & Thuan (2010); Pilyugin & Mattsson (2011), for further details). Both the NS- and the ON-calibrations avoid the often weak [O III]4363-line, and in the case of the NS-calibration also the [O II]3727 + 3729-lines, which are sometimes uncertain in LSBGs (combining all relevant uncertainties one finds that the \(R_2\)-index may have a \(\pm 20\)% uncertainty). Whenever possible, we also derive 'direct' \(T_e\)-based abundances according to Pilyugin, Vílchez & Thuan (2010).

The NS-calibration uses the \(N_2\) and \(S_2\) indices as a kind of 'substitute' for the electron temperature and the ionisation factor, while the ON-calibration uses the \(N_2\) and \(R_3\) indices. However, the \(R_3\) index is sometimes hard to determine in LSBGs. Two such examples are ESO 489-G56 and ESO 546-G34, Rönntack & Bergvall (2019) which are both most likely a very metal poor LSB galaxies. Using a calibration without \(R_3\), such as the NS-calibration, is therefore important to get a good handle on the abundances in some objects. This is especially true for the N/O ratio.

For a smaller number (13) of H ii-regions where the [O III]4363-line can be detected, we can also derive electron temperatures \(T_e\) and corresponding \(T_2\)-based abundances. More precisely, the \(O^+\)- and \(O^{++}\)-zone temperatures, \(t_1\) and \(t_2\), are obtained iteratively using recent calibrations by Pilyugin, Vílchez & Thuan (2010) based on the principles described in Pilyugin et al. (2004), i.e.,

\[
t_1 = \frac{1.467}{\log (R_3/R) - 0.876 - 0.193 \log(t_1) + 0.033 t_1}
\]

and

\[
t_2 = 0.314 + 0.672 t_1,
\]

where \(t_1\) and \(t_2\) are given in units of \(10^4\)K. The oxygen and nitrogen abundances can then be calculated from

\[
\log \left( \frac{O}{H} \right) = \log(O_2) + 1.667 \frac{1}{t_2}
\]

where

\[
\log(O_2) = \log(R_2) + 5.929 + \frac{1.617}{t_2} - 0.568 \log(t_2) - 0.008 t_2
\]

and

\[
\log \left( \frac{N}{O} \right) = \log \left( \frac{N_2}{R_2} \right) + 0.334 - \frac{0.724}{t_2} - 0.035 \log(t_2) + 0.005 t_2.
\]

The emission line data taken from Rönntack & Bergvall (1995) has been corrected for extinction and, more importantly, absorption features due to the underlying stellar population. The underlying absorption in the Balmer lines is tightly correlated with the strength of the 4000Å-break (Mattsson & Bergvall 2009). In terms of the \(D(4000)\)-parameter (Bruzual, 1983) the underlying absorption has a maximum just above \(D(4000) = 1\) (no or weak discontinuity). We find that all 23 H ii-regions considered in the present study have \(D(4000)\) close to unity and thus significant underlying absorption in Hα and Hβ is expected. Quantitatively, this means the correction is around 3Å in the equivalent width of Hα and 5Å in Hβ. We chose to keep the original corrections (listed in Table 2) made by Rönntack & Bergvall (1995) since reanalysis of a few objects (ESO 146-G14, ESO 158-G15 and ESO 546-G34) gave essentially the same result and the grid of SEMs used by Rönntack & Bergvall (1995) covers a larger part of parameter space. The software used for applying the original corrections was in itself corrected after Rönntack & Bergvall (1995) had published their results. Hence, the numbers presented here differ slightly from those in Rönntack & Bergvall (1995) in some cases.

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1 We used a more up to date grid of spectral evolution models (SEMs) computed using the code by Bruzual & Charlot (2003) and applied the same iterative scheme for correction as in Rönntack & Bergvall (1995), but now using \(D(4000)\) as an additional parameter. This correction scheme is a development of the preliminary results from Mattsson & Bergvall (2009) and will be discussed in detail in a forthcoming paper. A new larger grid of models is also under development.
3 RESULTS AND DISCUSSION

3.1 Abundances

The full set of derived abundances, together with the original numbers derived by Rönnback & Bergvall (1995), is presented in Table 2. We estimate the typical error (mainly due to the method itself) in abundances derived using the NS- and ON-calibrations to be ±0.1 dex, and the \( T_e \)-based abundances is expected to have slightly smaller total errors. The typical relative mean errors of the line intensities are 5-10%, which makes the strong-line calibration itself the dominant source of uncertainty. However, we would like to point out a caveat to the \( \text{[N II]} \)-flux in a satisfactory way. This may add further uncertainty to the line fluxes (see the detailed discussion in a forthcoming publication). Previous empirical estimates of the oxygen abundances in two of the three observed \( \text{H II} \)-regions, respectively. This galaxy is a local (redshift \( z = 0.00523 \)) dwarf galaxy of Magellanic type, which has an absolute magnitude of \( M_V = -14.7 \), a central surface brightness \( \mu_B = 22.9 \) and \( B - V = 0.38 \) (Rönnback & Bergvall 1994). The \( \text{H II} \) mass is estimated to be \( 5.4 \cdot 10^8 M_\odot \), and the total baryon mass is roughly \( 1.1 \cdot 10^9 M_\odot \) (previously unpublished data, to be presented in more detail in a forthcoming publication). Previous empirical estimates of the oxygen abundances in two of the three observed \( \text{H II} \)-regions were significantly higher (Rönnback & Bergvall 1995). The ON-abundances derived using the NS- and ON-calibrations we find one particular \( \text{H II} \)-region with a very low abundance. This is discussed in detail below.

Table 2. Derived abundances, using the notations \( \text{O/H}_\text{NS} = 12 + \log(\text{O/H}) \) and \( \text{N/O} = \log(\text{N/O}) \) for brevity, and corrections for underlying absorption \( (W_{\text{abs}}) \) in Angströms for the 23 \( \text{H II} \)-regions. All numbers are based on data from Rönnback & Bergvall (1995), except for ESO 146-G14 where data are taken from Bergvall & Rönnback (1993). \( T_{\text{e}} \)-abundances are according to Rönnback & Bergvall (1995) using the calibration by McGaugh (1994).

| Object       | \( \text{O/H}_{\text{NS}} \) | \( \text{O/H}_{\text{ON}} \) | \( \text{O/H}_{\beta} \) | \( \text{O/H}_{\text{NS}}^{\text{RB95}} \) | \( \text{N/O}_{\text{NS}} \) | \( \text{N/O}_{\text{ON}} \) | \( \text{N/O}_{\beta} \) | \( W_{\text{abs}}(\text{H} \alpha) \) | \( W_{\text{abs}}(\text{H} \beta) \) |
|--------------|----------------------------|----------------------------|---------------------------|--------------------------------|--------------------|--------------------|--------------------|-----------------------------|-----------------------------|
| 146G14B      | 7.83                       | 7.83                       | 7.69                      | 7.59                           | 8.02               | -1.48               | -1.42               | -1.38                        | -1.51                       | 5.0                 | 6.5                 |
| 146G14C      | 7.93                       | 7.91                       | 7.60                      | 7.54                           | -                  | -1.48               | -1.46               | -                            | -                           | 4.2                 | 4.8                 |
| 489G56A      | 7.59                       | 7.60                       | 7.47                      | 7.49                           | 7.63               | -1.50               | -1.41               | -1.37                        | -1.35                       | 4.0                 | 4.8                 |
| 489G56B      | 7.49                       | 7.52                       | -                         | 7.52                           | -1.46               | -1.30               | -                  | -                           | -                           | 4.2                 | 6.3                 |
| 505G04A      | 7.77                       | 7.75                       | 7.68                      | 7.63                           | 8.03               | -1.50               | -1.52               | -1.48                        | -1.44                       | 4.7                 | 5.8                 |
| 505G04B      | 7.82                       | 7.81                       | 7.82                      | 7.77                           | 8.01               | -1.47               | -1.47               | -1.47                        | -1.43                       | 4.5                 | 5.6                 |
| 546G34A      | 7.40                       | 7.38                       | -                         | 7.69                           | -1.55               | -1.60               | -                  | -                           | -                           | 4.9                 | 6.6                 |
| 546G34B      | 7.26                       | 7.25                       | -                         | 7.64                           | -1.52               | -1.56               | -                  | -                           | -                           | 3.3                 | 4.6                 |
| 462G22       | 7.82                       | 7.82                       | -                         | 7.99                           | -1.47               | -1.41               | -                  | -                           | -                           | 4.5                 | 6.6                 |
| 546G09       | 7.96                       | 7.96                       | -                         | 7.97                           | -1.46               | -1.35               | -                  | -                           | -                           | 2.6                 | 2.7                 |
| 158G15A      | 8.02                       | 8.00                       | 8.10                      | 8.07                           | 8.14               | -1.46               | -1.47               | -1.53                        | -1.49                       | 1.8                 | 3.8                 |
| 158G15B      | 7.60                       | 7.53                       | -                         | 8.24                           | -1.64               | -1.89               | -                  | -                           | -                           | 3.7                 | 4.5                 |
| 359G31A      | 7.97                       | 7.98                       | -                         | 8.05                           | -1.45               | -1.33               | -                  | -                           | -                           | 3.2                 | 4.0                 |
| 359G31B      | 7.95                       | 7.95                       | -                         | 8.05                           | -1.41               | -1.31               | -                  | -                           | -                           | 3.8                 | 4.7                 |
| 576G59A      | 7.96                       | 7.95                       | 8.14                      | 8.09                           | 8.02               | -1.44               | -1.41               | -1.49                        | -1.46                       | 3.1                 | 3.3                 |
| 576G59B      | 7.88                       | 7.88                       | 7.77                      | 7.81                           | 8.00               | -1.52               | -1.45               | -1.43                        | -1.47                       | 2.9                 | 3.0                 |
| 114G07A      | 7.95                       | 7.95                       | 8.01                      | 8.04                           | 8.00               | -1.48               | -1.38               | -1.42                        | -1.41                       | 2.7                 | 3.0                 |
| 114G07C      | 7.89                       | 7.89                       | 8.05                      | 8.03                           | 8.04               | -1.51               | -1.47               | -1.55                        | -1.52                       | 2.8                 | 3.2                 |
| 405G06A      | 7.90                       | 7.89                       | 7.89                      | 7.83                           | 8.10               | -1.47               | -1.42               | -1.36                        | -1.36                       | 4.1                 | 5.1                 |
| 405G06B      | 7.85                       | 7.83                       | -                         | 8.16                           | -1.44               | -1.44               | -                  | -                           | -                           | 2.9                 | 3.7                 |
| 405G06C      | 7.94                       | 7.92                       | 8.14                      | 8.11                           | 8.09               | -1.47               | -1.51               | -1.61                        | -1.59                       | 2.6                 | 2.8                 |
| 504G10A      | 7.97                       | 7.97                       | -                         | 8.12                           | -1.45               | -1.32               | -                  | -                           | -                           | 3.9                 | 5.5                 |
| 504G10B      | 8.02                       | 8.02                       | 8.14                      | 8.11                           | 8.05               | -1.45               | -1.38               | -1.44                        | -1.44                       | 5.7                 | 7.3                 |
log(O/H) + 12 = 7.26 for one of the two detected H α regions (Bergvall & Rönning, unpublished), which is essentially the same value we derive using both the NS- and the ON-calibration (see above and Table 2). This places ESO 546-G34 among the very most metal-poor galaxies known. ESO 546-G34 may thus be the most metal-poor LSBG ever observed.

ESO 546-G34 show strong oxygen lines relative to other emission lines, which may be a sign of significant shock heating of the interstellar gas. Rönning & Bergvall (1995) estimated that the shock contribution to Hβ in ESO 546-G34 is very significant - about 20%. But they also concluded that the corrections were only minor in most cases and therefore did not include any corrections for shock contributions in their abundance derivations. This does not seem to be appropriate for ESO 546-G34, however. Using a set of shock models (see Rönning & Bergvall 1995, and references therein) we confirm that the best fit to the spectra is obtained for a shock contribution to Hβ of ~ 20%. Consequently, we find very strong shock contributions to other lines, e.g., R1 has a 70-75% contribution from shocks. This is indeed more than expected, but our preliminary analysis shows that excluding shocks leads to a much worse fit. Taken at face value, the corrections imply that the oxygen abundance in both H α-regions is log(O/H) + 12 < 7.0, i.e., less than the extreme values of IZw 18 (see Kunth & Östlin 2000, and references therein), DDO 68 and SBS 0335-052W (Izotov & Thuan 2007). On the other hand, shock contributions to the line fluxes may increase the inferred electron temperature, which in principle could lead to higher abundances (after correction) when using the direct method. Hence, shock corrections can lead to both a lower or a higher abundance depending on the method/calibration used for deriving it. It is therefore unclear what the effect of shock contributions is in the present case, although it seems most likely the abundances will be corrected downwards.

In the spectra obtained by Rönning & Bergvall (1995) the [N ii]- and Hα-lines cannot be resolved as individual lines. Hence, there is a potential risk that the N2-index is underestimated. We have therefore measured the [N ii]- and [S ii]-lines in the high-resolution VLT/FORS2 spectra obtained by Zackrisson et al. (2006), covering the spectral region around Hα (5750-7310Å). It appears the [N ii]-line flux relative to Hβ may be slightly underestimated (the Hα-flux would hence be overestimated) in the study by Rönning & Bergvall (1995), but the data are still consistent within the uncertainties. For the [S ii]-lines there is good agreement, however. The N2-index is about 30% higher in the VLT observations compared to the same in the old data. If this is all due to line blending, then log(O/H)NS + 12 = 7.34 and log(O/H)ON + 12 = 7.33 for region B, and log(O/H)NS + 12 = 7.47 and log(O/H)ON + 12 = 7.46 for region A (not including any effects of shock heating). We cannot rule out the possibility that this may suggest slightly higher abundances, but to be certain new high-resolution spectra (over the whole relevant wavelength range) are needed. Nonetheless, the abundances derived here for ESO 546-G34 are under all circumstances unusually low and it is very unlikely that better data will make these numbers increase significantly.

3.3 Luminosity-metallicity relation and the BCG-LSBG connection

BCGs (or H α galaxies in general) may be triggered by mergers involving gas-rich galaxies with little star formation, e.g., LSBGs (Bergvall et al. 1999, 2000; Taylor et al. 1996; Taylor 1997). In Fig. 3 we show the oxygen abundances we derive for the LSBGs using the NS-method in a O/H vs. absolute B-magnitude diagram. Very metal-poor galaxies and LSBGs appear to fall below the usual luminosity-metallicity trend for spiral and irregular galaxies. For similar magnitudes log(O/H) is typically 0.5 dex lower in our LSBG sample as well as in very metal-poor BCGs (data taken from Kunth & Östlin 2000) and the H α sample by Brown, Kewley & Geller (2008). This may lend support to the idea of an evolutionary connection between LSBGs and BCGs, although the data is also consistent with a single relation with large scatter.

In case LSBGs and BCGs fall outside the regular luminosity-
dances using 'direct' methods, i.e., poor galaxy, although it would be necessary to confirm the abun-
domains below 1/10 of solar (12 + log(O/H) < 7.65), usually referred to as the extremely metal-poor regime.

metallicity relation, and there is an evolutionary connection between LSBGs and BCGs, what would this connection be? A most likely scenario is the one where BCGs are the result of a ma-
jor merger between a blue LSB galaxy and another (but evolved) galaxy of similar size, possibly a dwarf elliptical, thus trigger-
ing a starburst (Bergvall et al. 1999). This hypotheses naturally explains the LSB component detected in many BCGs (see, e.g. Bergvall et al. 1999, 2000). In such a case, there should be several very metal-poor LSBGs in the local Universe. We would hence like to encourage the community to search for such candidates.

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Figure 3. Luminosity-metallicity relation for various types of galaxies. LS-
BGs and BCGs seem to fall outside (~ 0.5 dex below in oxygen abundance) the relation for spiral and irregular galaxies. The filled black circles show the LSBG sample with mean oxygen abundances obtained using the NS-
calibration and B-band magnitudes taken from RB95, while the purple and blue filled circles show metal-poor BCGs and H α galaxies taken from the literature. The full line is a fit to the LSBGs and spiral galaxies (green circles with M_B brighter than ~17) from Pilyugin, Vilchez & Contini (2004). The dashed line shows the fit to the spiral and irregular galaxies derived by Garnett (2002, red circles); the dotted line show the same relation scaled down by 0.5 dex. Objects falling on the blue-shaded area have metallici-
ties below 1/10 of solar (12 + log(O/H) < 7.65), usually referred to as the extremely metal-poor regime.

4 CONCLUSIONS

We have reanalysed spectroscopic data for 23 H α-regions in blue, metal-poor LSBGs taking advantage of recent advances in cali-
brating strong-line methods by Pilyugin, Vilchez & Thuan (2010) and Pilyugin & Mattsson (2011). We have identified a galaxy (ESO
546-G34) which may be the most metal-poor LSB galaxy in the local Universe. We are reasonably sure this is an extremely metal-
poor galaxy, although it would be necessary to confirm the abun-
dances using 'direct' methods, i.e., T_e-based abundance determina-
tions. For this to be possible ESO 546-G34 needs to be re-observed

Finally, we think there is new evidence that blue metal-poor LSBGs, together with many BCGs and H α galaxies, fall outside the
regular luminosity-metallicity relation. This suggests there might be an evolutionary connection between LSBGs and BCGs to be found, as suggested by Bergvall et al. (1999, 2000). In such a case, there should be several very metal-poor LSBGs in the local Universe. We
would hence like to encourage the community to search for such candidates.
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