**Table 1** Reddenings, Observed and dereddened line ratios and spectral classifications

| Name<br>(1) | | Galactic Extincion E(B-V)<br>(2) | Hα/Hβ<br>(3) | E(B-V)<br>(4) | [OIII]/Hβ<br>(5) | [OI]/Hα<br>(6) | [NII]/Hα<br>(7) | [SII]/Hα<br>(8) | C6563/C4861<br>(9) | Spectral Types<br>(10) | Classification in Veron Catalog(1993)<br>(11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 00189+3748 | A | 0.07 | 8.33 | 0.92 | -0.78: | -1.22 | -0.39 | -0.60 | 1.42 | LH | |
| | | | 3.10 | | -0.83: | -1.17 | -0.39 | -0.63 | | | |
| | B | 0.07 | 5.00 | 0.41 | -0.30 | -1.22; | -0.24 | -0.41 | 1.27 | LH | |
| | | | 3.10 | | -0.32 | -1.19; | -0.25 | -0.43 | | | |
| 00267+3016 | A | 0.04 | 14.29 | 1.48 | 0.20 | -1.05 | -0.21 | -0.39: | 1.00 | L | |
| | | | 3.10 | | 0.12 | -0.97 | -0.21 | -0.43: | | | |
| | B | 0.04 | 10.00 | 1.13 | 0.11 | -1.10 | -0.25 | -0.52: | 0.95 | LH | |
| | | | 3.10 | | 0.06 | -1.03 | -0.26 | -0.56: | | | |
| 00509+1225 | | 0.05 | 3.57 | 0.09 | – | – | – | – | 0.85 | S1 | S1 |
| | | | 3.10 | | – | – | – | – | | | |
| 01173+1405 | | 0.02 | 5.88 | 0.62 | -0.08 | -1.15 | -0.42 | -0.42 | 0.91: | LH | |
| | | | 3.10 | | -0.12 | -1.12 | -0.42 | -0.44 | | | |
| 01324+2138 | | 0.06 | 9.09 | 1.02 | 0.48 | -1.15 | -0.12 | -0.46: | 1.45: | LH | |
| | | | 3.10 | | 0.43 | -1.10 | -0.12 | -0.49: | | | |
| 01484+2220 | | 0.07 | 7.14 | 0.84 | -0.85: | -1.40 | -0.41: | -0.77 | 1.15 | H | |
| | | | 2.85 | | -0.89: | -1.35 | -0.41: | -0.80 | | | |
| 01572+0009 | | 0.00 | 2.86 | 0.00 | 0.05 | -2.00 | -0.85 | -1.52: | 0.80 | S1 | S1 |
| | | | 3.10 | | 0.05 | -2.00 | -0.85 | -1.52: | | | |
| 02071+3857 | | 0.04 | 33.33: | 2.42: | 0.12; | -1.70 | -0.35 | -0.62 | 1.19: | H | |
| | | | 2.85 | | 0.00; | -1.57 | -0.36 | -0.69 | | | |
| 02203+3158 | A | 0.06 | 14.29: | 1.46: | 0.46: | -1.22; | -0.14: | -0.51 | 1.12 | LH | S? |
| | | | 3.10 | | 0.38: | -1.14; | -0.14: | -0.55 | | | |
| | B | 0.06 | 10.00 | 1.19 | – | -2.00 | -0.41 | -0.62 | 0.94 | H | |
| | | | 2.85 | | – | -1.93 | -0.41 | -0.66 | | | |
| 02222+2159 | | 0.08 | 9.09; | 1.07; | -0.14; | -1.40 | -0.40 | -0.66: | 1.26: | H | |
| | | | 2.85 | | -0.19; | -1.34 | -0.40 | -0.69: | | | |
| 02248+2621 | | 0.06 | 5.88 | 0.66 | -0.39 | -1.70 | -0.17 | -0.68 | 0.74 | H | |
| | | | 2.85 | | -0.42 | -1.66 | -0.18 | -0.70 | | | |
| 02435+1253 | | 0.08 | 16.67; | 1.60; | 0.30; | -1.00: | -0.30: | -0.55: | 1.61: | LH | |
| | | | 3.10 | | 0.22; | -0.91: | -0.31: | -0.61: | | | |
| 02512+1446 | A | 0.07 | 7.14 | 0.85 | -0.24 | -1.52 | -0.35: | -0.55 | 0.98 | H | |
| | | | 2.85 | | -0.29 | -1.48 | -0.35: | -0.58 | | | |
| | B | 0.07 | – | – | – | – | – | – | 1.36 | O | |
| | | | – | | – | – | – | – | | | |
| 03117+4151 | A | 0.17 | 7.69 | 0.74 | 0.89 | -1.15 | -0.07 | -0.38 | 1.30 | S2 | S2 |
| | | | 3.10 | | 0.85 | -1.11 | -0.07 | -0.40 | | | |
| | B | 0.17 | – | – | – | – | -0.38 | – | 1.41 | H | |
| | | | 2.85 | | – | – | – | – | | | |
| | C | 0.17 | – | – | – | – | – | – | 1.27: | O | |
| | | | – | | – | – | – | – | | | |
| (05084+7936) | | 0.09 | 10.00: | 1.16: | -0.22; | -1.30; | -0.39 | -0.62 | 1.06: | H | |
| | | | 2.85 | | -0.28; | -1.24; | -0.39 | -0.66 | | | |
| (05414+5840) | | 0.29 | – | – | – | – | 0.26 | -0.21; | 1.53: | S? | |
| | | | 3.10 | | – | – | – | – | | | |
| (06538+4628) | | 0.08 | 4.55 | 0.39 | -0.26 | -1.40 | -0.36 | -0.46 | 0.68: | H | |
| | | | 2.85 | | -0.29 | -1.37 | -0.36 | -0.47 | | | |
| 07063+2043 | A | 0.11 | 7.69 | 0.87 | -0.34 | -1.52 | -0.20 | -0.47 | 0.95: | H | |
| | | | 2.85 | | -0.38 | -1.47 | -0.20 | -0.50 | | | |
| (07062+2041) | B | 0.11 | 4.35 | 0.30 | -0.36 | -1.40; | -0.40 | -0.51 | 0.82 | H | |
| | | | 2.85 | | -0.38 | -1.38; | -0.40 | -0.52 | | | |
| (07256+3355) | A | 0.06 | 14.29 | 1.55 | -0.54: | -2.00; | -0.29 | -0.60 | 1.46: | H | |
| | | | 2.85 | | -0.62: | -1.92; | -0.30 | -0.65 | | | |
| | B | 0.06 | 3.57 | 0.17 | – | -1.52; | -0.39 | -0.44 | 0.79: | H | |
| | | | 2.85 | | – | -1.51; | -0.39 | -0.45 | | | |
| | C | 0.06 | – | – | – | – | – | – | 1.20 | O | |
| | | | – | | – | – | – | – | | | |

**Table 1** –Continued

| Name (1) | | Galactic Extinction E(B-V) (2) | Hα / Hβ (3) | E(B-V) (4) | [OIII] / Hβ (5) | [OI] / Hα (6) | [NII] / Hα (7) | [SII] / Hα (8) | C6563 / C4861 (9) | Spectral Types (10) | Classification in Veron Catalog(1993) (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 08354+2555 | | 0.02 | – | – | – | -0.82; | -0.08 | -0.21: | 1.00 | S? | |
| | | | 3.10 | | – | – | – | – | | | |
| 08507+3520 | A | 0.01 | – | – | – | – | -0.02 | -0.14 | 1.07: | S? | |
| | | | 3.10 | | – | – | – | – | | | |
| | B | 0.01 | – | – | – | -1.05; | -0.21: | -0.30 | 1.05: | S? | |
| | | | 3.10 | | – | – | – | – | | | |
| | C | 0.01 | – | – | – | -1.05; | -0.17 | -0.15; | 0.88: | S? | |
| | | | 3.10 | | – | – | – | – | | | |
| (09047+1838) | | 0.03 | 10.00 | 1.23 | -0.30: | -1.30 | -0.35 | -0.57 | 1.19 | H | |
| | | | 2.85 | | -0.36: | -1.24 | -0.35 | -0.61 | | | |
| 09126+4432 | A | 0.00 | 25.00; | 2.09; | 0.44; | -0.96 | -0.20 | -0.47: | 1.05 | LH | |
| | | | 3.10 | | 0.34; | -0.85 | -0.21 | -0.53: | | | |
| | B | 0.00 | – | – | – | – | -0.30 | -0.44; | 1.19: | H | |
| | | | 2.85 | | – | – | – | – | | | |
| 09168+3308 | | 0.00 | 4.00 | 0.34 | -0.44 | -1.30; | -0.36 | -0.54 | 0.86 | H | |
| | | | 2.85 | | -0.46 | -1.28; | -0.36 | -0.55 | | | |
| 09320+6134 | | 0.02 | 7.69: | 0.88: | 0.12: | -1.00; | 0.04 | -0.39 | 1.20 | L | S |
| | | | 3.10 | | 0.07: | -0.95; | 0.03 | -0.41 | | | |
| 09333+4841 | A | 0.01 | 9.09 | 1.15 | -0.04 | -1.30 | -0.24 | -0.48 | 0.92 | H | |
| | | | 2.85 | | -0.10 | -1.24 | -0.24 | -0.52 | | | |
| | B | 0.01 | – | – | – | – | -0.66 | – | 0.78: | H | |
| | | | 2.85 | | – | – | – | – | | | |
| (09517+6954) | | 0.03 | 11.11 | 1.33 | -0.35 | -1.70 | -0.21 | -0.54 | 1.69 | H | |
| | | | 2.85 | | -0.42 | -1.63 | -0.22 | -0.58 | | | |
| 10203+5235 | | 0.00 | 5.88 | 0.64 | 0.17 | -1.10 | -0.21 | -0.40 | 0.99 | L | |
| | | | 3.10 | | 0.14 | -1.06 | -0.21 | -0.42 | | | |
| (10311+3507) | | 0.00 | 5.26 | 0.61 | -0.68 | -1.30 | -0.40 | -0.57: | 0.90 | H | |
| | | | 2.85 | | -0.71 | -1.27 | -0.40 | -0.59: | | | |
| (10565+2448) | | 0.00 | 8.33 | 0.99 | -0.04 | -1.05 | -0.19 | -0.52 | 0.80: | LH | |
| | | | 3.10 | | -0.09 | -1.00 | -0.19 | -0.55 | | | |
| 11231+1456 | A | 0.01 | 8.33 | 0.97 | -0.78: | -1.15 | -0.28 | -0.64 | 1.15: | LH | |
| | | | 3.10 | | -0.83: | -1.10 | -0.28 | -0.67 | | | |
| | B | 0.01 | 6.67 | 0.75 | -0.27: | -1.22 | -0.12 | -0.60 | 1.14: | LH | |
| | | | 3.10 | | -0.31: | -1.18 | -0.12 | -0.63 | | | |
| 11254+1126 | | 0.03 | 10.00 | 1.14 | 0.26 | -1.22 | -0.07 | -0.55 | 1.26 | LH | |
| | | | 3.10 | | 0.20 | -1.16 | -0.07 | -0.59 | | | |
| 11257+5850 | A | 0.00 | 2.94 | 0.00 | -0.05 | -1.52 | -0.47 | -0.60 | 0.69 | H | H2 |
| | | | 2.85 | | -0.05 | -1.52 | -0.47 | -0.60 | | | |
| | B | 0.00 | 4.76 | 0.43 | 0.02 | -1.15 | -0.40 | -0.39 | 0.98 | LH | |
| | | | 3.10 | | 0.00 | -1.13 | -0.40 | -0.40 | | | |
| 11543+0124 | | 0.00 | 33.33; | 2.37; | 0.43; | -1.22 | -0.43 | -0.59: | 0.97: | LH | |
| | | | 3.10 | | 0.31; | -1.10: | -0.44 | -0.66: | | | |
| (12112+0305) | A | 0.01 | 6.25: | 0.69: | 0.24: | -1.22; | -0.38 | -0.25: | 0.83: | LH | |
| | | | 3.10 | | 0.21: | -1.19; | -0.38 | -0.27: | | | |
| | C | 0.01 | 4.55: | 0.37: | 0.25: | -0.77; | -0.22 | -0.62: | 0.96: | LH | |
| | | | 3.10 | | 0.23: | -0.75; | -0.22 | -0.63: | | | |
| 12120+6838 | A | 0.01 | 7.69 | 0.90 | -0.03 | -1.15 | -0.24 | -0.32 | 1.13 | LH | |
| | | | 3.10 | | -0.08 | -1.11 | -0.25 | -0.35 | | | |
| | C | 0.01 | 6.25; | 0.69; | -0.20; | -1.22; | -0.38 | -0.28: | 0.89: | LH | |
| | | | 3.10 | | -0.24; | -1.19; | -0.38 | -0.30: | | | |
| | D | 0.01 | 4.55 | 0.46 | -0.09 | -1.40; | -0.48 | -0.44 | 0.68 | H | |
| | | | 2.85 | | -0.11 | -1.37; | -0.48 | -0.46 | | | |
| 12251+4026 | | 0.00 | 6.67 | 0.85 | -0.40 | -1.52 | -0.28 | -0.57 | 0.92 | H | |
| | | | 2.85 | | -0.44 | -1.48 | -0.28 | -0.59 | | | |
| 12265+0219 | | 0.00 | 1.43 | 0.00 | -0.70 | – | -1.40 | – | 0.50 | S1 | QSO |
| | | | 3.10 | | -0.70 | – | -1.40 | – | | | |

**Table 1** –Continued

| Name (1) | | Galactic Extincion E(B-V) (2) | Hα —— Hβ (3) | E(B-V) (4) | [OIII] —— Hβ (5) | [OI] —— Hα (6) | [NII] —— Hα (7) | [SII] —— Hα (8) | C6563 —— C4861 (9) | Spectral Types (10) | Classification in Veron Catalog(1993) (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12323+1549 | A | 0.00 | 11.11; | 1.27; | – | -0.92; | -0.43 | -0.20 | 0.65: | LH | |
| | | | 3.10 | | – | -0.86; | -0.44 | -0.24 | | | |
| | B | 0.00 | 2.70 | 0.00 | -0.29 | -1.70; | -0.82: | -1.05 | 0.63: | S1 | S1 |
| | | | 3.10 | | -0.29 | -1.70; | -0.82: | -1.05 | | | |
| 12540+5708 | | 0.00 | 5.88 | 0.64 | – | – | – | – | 0.99 | S1 | S1 |
| | | | 3.10 | | – | – | – | – | | | |
| 12592+0436 | | 0.00 | 6.25; | 0.70; | 0.00; | -0.70; | 0.02 | -0.38: | 0.92 | L | |
| | | | 3.10 | | -0.03; | -0.66; | 0.02 | -0.40: | | | |
| 13136+6223 | A | 0.01 | 5.88 | 0.72 | 0.00 | -1.40 | -0.37 | -0.57 | 1.17 | H | |
| | | | 2.85 | | -0.04 | -1.36 | -0.37 | -0.59 | | | |
| | B | 0.01 | 9.09; | 1.07; | 0.30; | -1.22 | -0.24 | -0.28: | 1.39 | LH | |
| | | | 3.10 | | 0.25; | -1.17 | -0.25 | -0.32: | | | |
| 13183+3423 | | 0.00 | 33.33: | 2.37; | 0.48: | -0.92 | -0.28 | -0.47 | 1.04 | LH | |
| | | | 3.10 | | 0.36: | -0.80 | -0.29 | -0.54 | | | |
| 13299+1121 | | 0.00 | 5.26 | 0.61 | -0.16 | -1.52 | -0.38 | -0.55 | 0.98 | H | H2 |
| | | | 2.85 | | -0.19 | -1.49 | -0.38 | -0.57 | | | |
| 13362+4831 | A | 0.00 | 4.35 | 0.34 | 0.18 | -0.92 | -0.19 | -0.32 | 1.05 | L | S |
| | | | 3.10 | | 0.17 | -0.90 | -0.19 | -0.33 | | | |
| | B | 0.00 | 5.88 | 0.64 | 0.77 | -1.40 | -0.25 | -0.39 | 1.01 | S2 | S2 |
| | | | 3.10 | | 0.74 | -1.37 | -0.25 | -0.41 | | | |
| 13373+0105 | A | 0.00 | – | – | – | – | -0.30 | -0.44: | 1.22 | LH | |
| | | | 3.10 | | – | – | – | – | | | |
| | B | 0.00 | 3.85 | 0.30 | -0.11 | -1.70; | -0.52 | -0.64: | 0.74 | H | |
| | | | 2.85 | | -0.13 | -1.68; | -0.52 | -0.65: | | | |
| 13428+5608 | | 0.00 | 11.11 | 1.28 | 0.90 | -0.96 | -0.06 | -0.28 | 1.30 | S2 | S2 |
| | | | 3.10 | | 0.83 | -0.89 | -0.07 | -0.31 | | | |
| 13458+1540 | A | 0.00 | 5.88 | 0.72 | -0.28 | -1.40; | -0.43 | -0.52 | 0.67 | H | |
| | | | 2.85 | | -0.31 | -1.36; | -0.44 | -0.54 | | | |
| | B | 0.00 | 4.17 | 0.38 | -0.20 | -1.22; | -0.35 | -0.54 | 0.79 | H | |
| | | | 2.85 | | -0.22 | -1.20; | -0.35 | -0.55 | | | |
| 13496+0221 | A | 0.01 | 12.50: | 1.47: | -0.30; | – | -0.21: | -0.66: | 1.01 | H | |
| | | | 2.85 | | -0.37; | – | -0.22: | -0.70: | | | |
| | B | 0.01 | – | – | – | -1.22; | -0.34 | -0.49: | 1.18: | H | |
| | | | 2.85 | | – | – | – | – | | | |
| | C | 0.01 | – | – | – | – | -0.59; | – | 0.88: | H | |
| | | | 2.85 | | – | – | – | – | | | |
| 13536+1836 | | 0.00 | 6.67 | 0.76 | 0.92 | -1.40 | -0.38: | -0.42 | 1.04 | S2 | S1 |
| | | | 3.10 | | 0.88 | -1.36 | -0.38: | -0.44 | | | |
| 14151+2705 | A | 0.00 | 25.00: | 2.09: | 0.30: | -1.70: | -0.14 | -0.46 | 0.98 | LH | S2 |
| | | | 3.10 | | 0.20: | -1.59: | -0.15 | -0.52 | | | |
| | B | 0.00 | – | – | – | – | -0.35 | – | 1.20 | H | |
| | | | 2.85 | | – | – | – | – | | | |
| 14178+4927 | | 0.01 | 7.69 | 0.90 | -0.41; | -1.30; | -0.15 | -0.62 | 1.16 | LH | H2 |
| | | | 3.10 | | -0.46; | -1.25; | -0.15 | -0.65 | | | |
| 14547+2448 | A | 0.03 | 8.33: | 0.96: | 0.28: | -1.00 | -0.10 | -0.26 | 1.55 | L | |
| | | | 3.10 | | 0.23: | -0.95 | -0.10 | -0.29 | | | |
| | B | 0.03 | 3.45 | 0.16 | -0.76; | – | -0.44: | -0.59; | 0.93: | H | |
| | | | 2.85 | | -0.77; | – | -0.44: | -0.59; | | | |
| 14568+4504 | | 0.01 | 5.26 | 0.52 | 0.18 | -1.30; | -0.17 | -0.52 | 1.05 | LH | |
| | | | 3.10 | | 0.16 | -1.27; | -0.17 | -0.54 | | | |
| 15107+0724 | | 0.01 | – | – | – | – | -0.29 | -0.42 | 1.04: | H | |
| | | | 2.85 | | – | – | – | – | | | |
| 15163+4255 | | 0.01 | 9.09 | 1.15 | 0.00 | -1.52 | -0.32 | -0.55 | 1.05 | H | |
| | | | 2.85 | | -0.06 | -1.46 | -0.32 | -0.59 | | | |

**Table 1** –Continued

| Name (1) | | Galactic Extincion E(B-V) (2) | Hα —– Hβ (3) | E(B-V) (4) | [OIII] —– Hβ (5) | [OI] —– Hα (6) | [NII] —– Hα (7) | [SII] —– Hα (8) | C6563 —– C4861 (9) | Spectral Types (10) | Classification in Veron Catalog(1993) (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15327+2340 | | 0.04 | – | – | – | -0.48; | 0.19 | 0.05: | 1.64: | S? | S2 |
| | | | 3.10 | | – | – | – | – | | | |
| 15425+4114 | A | 0.01 | 5.56 | 0.65 | 0.09 | -1.30 | -0.44 | -0.49 | 0.72 | H | |
| | | | 2.85 | | 0.05 | -1.27 | -0.45 | -0.51 | | | |
| 15426+4116 | B | 0.01 | 2.94: | 0.00 | – | -0.59; | -0.22 | -0.64: | 0.94 | LH | |
| | | | 3.10 | | – | -0.58; | -0.22 | -0.64: | | | |
| 16104+5235 | | 0.00 | 5.56 | 0.67 | -0.35 | -2.00 | -0.35 | -0.70 | 0.87 | H | |
| | | | 2.85 | | -0.38 | -1.97 | -0.35 | -0.72 | | | |
| 16180+3753 | | 0.00 | 2.63 | 0.00 | -0.88; | -1.22; | -0.29 | -0.48: | 1.06 | H | |
| | | | 2.85 | | -0.88; | -1.22; | -0.29 | -0.48: | | | |
| 16284+0411 | | 0.06 | 10.00: | 1.10: | -0.52; | -1.10 | -0.28 | -0.66 | 1.42 | LH | |
| | | | 3.10 | | -0.58; | -1.03 | -0.29 | -0.69 | | | |
| 16504+0228 | | 0.07 | 16.67 | 1.61 | 0.30 | -0.46 | 0.06 | 0.03 | 2.54 | L | S1 |
| | | | 3.10 | | 0.22 | -0.37 | 0.05 | -0.02 | | | |
| 16577+5900 | A | 0.00 | 2.56 | 0.00 | – | -0.89 | -0.29 | -0.36: | 1.29: | LH | |
| | | | 3.10 | | – | -0.89 | -0.29 | -0.36: | | | |
| | B | 0.00 | 9.09: | 1.07: | 0.00: | -1.15 | -0.28 | -0.41 | 1.24 | LH | |
| | | | 3.10 | | -0.05: | -1.10 | -0.29 | -0.44 | | | |
| 16589+0521 | | 0.07 | 16.67: | 1.70: | -0.30: | -1.52 | -0.42 | -0.52 | 2.59: | H | |
| | | | 2.85 | | -0.39: | -1.43 | -0.43 | -0.57 | | | |
| 17366+8646 | | 0.05 | 25.00: | 2.12: | 0.10: | -1.70; | -0.42 | -0.70 | 1.13 | H | |
| | | | 2.85 | | -0.01: | -1.59; | -0.43 | -0.76 | | | |
| 17392+3845 | | 0.03 | 7.14 | 0.89 | -0.45: | -1.70; | -0.31 | -0.55 | 1.35: | H | |
| | | | 2.85 | | -0.49: | -1.65; | -0.31 | -0.58 | | | |
| 17501+6825 | A | 0.05 | 5.88 | 0.68 | -0.23 | -1.40 | -0.33 | -0.60 | 1.09: | H | |
| | | | 2.85 | | -0.27 | -1.36 | -0.33 | -0.62 | | | |
| | B | 0.05 | 8.33 | 0.94 | 0.34 | -1.10 | -0.23 | -0.55 | 1.29: | LH | |
| | | | 3.10 | | 0.29 | -1.04 | -0.23 | -0.58 | | | |
| | C | 0.05 | 7.14; | 0.87; | 0.11; | – | -0.39 | -0.51: | 1.13: | H | |
| | | | 2.85 | | 0.06; | – | -0.39 | -0.54: | | | |
| | D | 0.05 | 5.00: | 0.43: | -0.52; | -1.05; | -0.26 | -0.33 | 1.09: | LH | |
| | | | 3.10 | | -0.55; | -1.02; | -0.26 | -0.34 | | | |
| 18525+5518 | | 0.07 | 9.09: | 1.09: | 0.00: | -1.30 | -0.31: | -0.55 | 1.22: | H | |
| | | | 2.85 | | -0.06: | -1.24 | -0.31: | -0.59 | | | |
| 18595+5048 | | 0.04 | 16.67; | 1.64; | 0.18; | -1.52; | -0.08 | -0.42 | 1.39 | LH | |
| | | | 3.10 | | 0.09; | -1.44; | -0.09 | -0.47 | | | |
| 19120+7320 | A | 0.09 | 11.11 | 1.18 | 0.65 | -1.52 | -0.24 | -0.57 | 1.37 | S2 | |
| | | | 3.10 | | 0.58 | -1.46 | -0.24 | -0.61 | | | |
| | B | 0.09 | 9.09 | 1.07 | -1.04; | -1.70; | -0.35 | -0.66 | 1.62 | H | |
| | | | 2.85 | | -1.10; | -1.64; | -0.35 | -0.69 | | | |
| 20550+1656 | | 0.10 | 4.76 | 0.41 | 0.35 | -1.52 | -0.68 | -0.77 | 0.81 | H | |
| | | | 2.85 | | 0.32 | -1.50 | -0.68 | -0.79 | | | |
| 22388+3359 | | 0.09 | – | – | – | -1.30: | -0.16 | -0.47 | 1.20 | LH | |
| | | | 3.10 | | – | – | – | – | | | |
| 22501+2427 | | 0.05 | 4.35 | 0.37 | -0.41 | -1.52; | -0.24 | -0.92 | 0.61: | H | H2 |
| | | | 2.85 | | -0.43 | -1.50; | -0.25 | -0.93 | | | |
| 23007+0836 | A | 0.03 | 3.33 | 0.04 | -0.15 | -2.00 | -0.64 | -0.96: | 1.00 | S1 | S1 |
| | | | 3.10 | | -0.16 | -2.00 | -0.64 | -0.96: | | | |
| | B | 0.03 | – | – | – | -0.96 | -0.30 | -0.36: | 0.98 | S? | |
| | | | 3.10 | | – | – | – | – | | | |
| 23024+1916 | | 0.03 | 9.09 | 1.04 | 0.04 | -1.30 | -0.21; | -0.42 | 1.61: | LH | |
| | | | 3.10 | | -0.01 | -1.25 | -0.22; | -0.45 | | | |
| 23135+2516 | | 0.07 | 9.09: | 1.01: | 0.48: | -1.15 | 0.00 | -0.48 | 1.23 | LH | |
| | | | 3.10 | | 0.43: | -1.10 | 0.00 | -0.51 | | | |

**Table 1** –Continued

| Name (1) | | Galactic Extincion E(B-V) (2) | Hα/Hβ (3) | E(B-V) (4) | [OIII]/Hβ (5) | [OI]/Hα (6) | [NII]/Hα (7) | [SII]/Hα (8) | C6563/C4861 (9) | Spectral Types (10) | Classification in Veron Catalog(1993) (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23254+0830 | A | 0.03 | 33.33; | 2.43; | – | -1.40 | -0.31 | -0.36 | 1.13 | H | |
| | | | 2.85 | | – | -1.27: | -0.32 | -0.43 | | | |
| | B | 0.03 | 4.17 | 0.27 | 1.00 | -1.05 | -0.08 | -0.49 | 1.01 | S2 | S1 |
| | | | 3.10 | | 0.99 | -1.03 | -0.08 | -0.50 | | | |
| | C | 0.03 | – | – | – | – | – | – | 0.95 | O | |
| | | | – | | – | – | – | – | | | |
| | D | 0.03 | – | – | – | – | – | – | 1.00 | O | |
| | | | – | | – | – | – | – | | | |
| 23488+1949 | A | 0.03 | 10.00 | 1.22 | -0.52; | -1.70 | -0.42 | -0.72 | 1.08 | H | |
| | | | 2.85 | | -0.58; | -1.63 | -0.43 | -0.76 | | | |
| | B | 0.03 | 5.00 | 0.53 | -0.15 | -1.52 | -0.48: | -0.51: | 0.79 | H | |
| | | | 2.85 | | -0.18 | -1.49 | -0.48: | -0.52: | | | |
| | C | 0.03 | 7.14 | 0.80 | -0.85; | -1.15 | -0.40 | -0.66 | 0.88 | LH | |
| | | | 3.10 | | -0.89; | -1.11 | -0.40 | -0.69 | | | |
| 23488+2018 | A | 0.03 | 11.11 | 1.33 | -0.35: | -1.52 | -0.26 | -0.62 | 1.24 | H | |
| | | | 2.85 | | -0.42: | -1.45 | -0.26 | -0.66 | | | |
| | B | 0.03 | 3.57 | 0.20 | 0.23 | -1.22: | -0.89 | -0.57 | 0.83 | H | |
| | | | 2.85 | | 0.22 | -1.21: | -0.89 | -0.57 | | | |
| 23532+2513 | A | 0.04 | – | – | – | – | -0.34 | – | 1.29: | H | |
| | | | 2.85 | | – | – | – | – | | | |
| | B | 0.04 | 2.56: | 0.00: | -0.51 | – | -1.40 | – | 0.82: | S1 | |
| | | | 3.10 | | -0.51 | – | -1.40 | – | | | |
| | C | 0.04 | 5.56 | 0.63 | 0.05 | -1.52 | -0.29 | – | 1.00: | H | |
| | | | 2.85 | | 0.01 | -1.49 | -0.29 | – | | | |
| 23594+3622 | | 0.09 | 33.33; | 2.28; | 1.00; | -0.74 | 0.30 | -0.14 | 1.15 | S2 | |
| | | | 3.10 | | 0.88; | -0.62: | 0.29 | -0.21 | | | |

**Notes**:
The sources in brackets are those not belong to the 73 complete samples. The uncertainty of value is about 15%;
The values with colon(:) and semicolon(;) have uncertainties 30% and 50% respectively.
Column ( 2) – The Galactic extinction from machine-readable database (D. Burstein, 1993)
Column ( 3) – Observed and theoretical Hα/Hβ values
Column ( 4) – Color excesses determined from Hα/Hβ
Column ( 5) – Logarithms of [OIII]λ5007/Hβ and dereddened ratio [OIII]λ5007/Hβ
Column ( 6) – Logarithms of [OI]λ6300/Hα and dereddened ratio [OI]λ6300/Hα
Column ( 7) – Logarithms of [NII]λ6584/Hα and dereddened ratio [NII]λ6584/Hα
Column ( 8) – Logarithms of [SII]λ6716 + λ6731/Hα and dereddened ratio [SII]λ6716 + λ6731/Hα
Column ( 9) – Ratios of continuum fluxes at 6563Å and 4861Å
Column (10) – Spectral types determined from [OIII]/Hβ, [OI]/Hα, [NII]/Hα and [SII]/Hα. *S1*: Seyfert 1; *S2*: Seyfert 2; *L*: LINER; *H*: HII galaxy; *S?*: Seyfert 2 or LINER; *LH*: mixture type with properties of both LINER and HII galaxy; *O*: other galaxy
Column (11) – Spectral types from Verons' Catalog of quasars and active galactic nuclei(1993). *S1*: Seyfert 1; *S2*: Seyfert 2; *H2*: HII galaxy; *S or S?*: Could be Seyfert or LINER.

**Table 2a** Spectral and morphological classification (All the VLIRGs we observed)

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | total(0-6) |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| S1 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 6 |
| S2 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 6 |
| L | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 6 |
| LH | 6 | 2 | 1 | 1 | 3 | 3 | 7(9) | 23(25) |
| S? | 0 | 0 | 0(1) | 0 | 0 | 0 | 3 | 3(4) |
| H | 3 | 1 | 2 | 2 | 5(9) | 2(3) | 14(16) | 29(36) |
| total | 13 | 3 | 3(4) | 3 | 10(14) | 5(6) | 36(40) | 73(83) |

**Note**:
Here we list the results of the complete sample of 73 VLIRGs. The numbers enclosed in brackets include all the sources we obsevbed. *S1*: Seyfert 1s; *S2*: Seyfert 2s; *L*: LINERs; *LH*: mixture of LINERs and HII galaxies; *H*: HII galaxies; *S?*: Seyfert 2s or LINERs.

**Table 2b** Spectral and morphological classification ($11.5 \leq \mathrm{Log}(\mathrm{L_{IR}}/\mathrm{L_\odot}) \leq 12.0$)

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | total(0-6) |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| S1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| S2 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 5 |
| L | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 4 |
| LH | 6 | 2 | 1 | 1 | 3 | 3 | 5 | 21 |
| S? | 0 | 0 | 0(1) | 0 | 0 | 0 | 2 | 2(3) |
| H | 3 | 1 | 2 | 2 | 5(7) | 2(3) | 12(14) | 27(32) |
| total | 12 | 3 | 3(4) | 3 | 10(12) | 5(6) | 26(28) | 62(68) |

**Table 2c** Spectral and morphological classification ($\mathrm{Log}(\mathrm{L_{IR}}/\mathrm{L_\odot}) \geq 12.0$)

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | total(0-6) |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| S1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 |
| S2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| L | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| LH | 0 | 0 | 0 | 0 | 0 | 0 | 2(4) | 2(4) |
| S? | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| H | 0 | 0 | 0 | 0 | 0(2) | 0 | 2 | 2(4) |
| total | 1 | 0 | 0 | 0 | 0(2) | 0 | 10(12) | 11(15) |

**Table 3** Environmental and morphological parameters of VLIRGs

| IRAS (1) | | Distance (Mpc) (2) | Morphological classification (3) | Proj. Sep. ( kpc ) (4) | Redshift difference (5) | Comments (6) |
|---|---|---|---|---|---|---|
| 00189+3748 | A | 222.53 | 4 | – | 0.0000 | $\geq$ 1 component |
| | B | 212.15 | – | 67.32 | 0.0017 | |
| 00267+3016 | A | 306.04 | 6 | – | 0.0000 | 2 nuclei,merger |
| | B | 306.04 | – | 15.89 | 0.0000 | |
| 00509+1225 | | 366.43 | 6 | 27.18 | – | merger |
| 01173+1405 | | 186.79 | 3 | 48.34 | – | pair |
| 01324+2138 | | 285.30 | 0 | – | – | |
| 01484+2220 | | 191.77 | 6 | – | – | disturbed |
| 01572+0009 | | 1007.19 | 6 | – | – | disturbed |
| 02071+3857 | | 105.75 | 6 | – | – | serious disturbed |
| 02203+3158 | A | 206.20 | 5 | – | 0.0000 | close pair |
| | B | 203.15 | – | 48.56 | 0.0005 | |
| 02222+2159 | | 200.06 | 1 | – | – | |
| 02248+2621 | | 194.50 | 6 | 5.13 | – | merger, tail |
| 02435+1253 | | 125.37 | 1 | – | – | |
| 02512+1446 | A | 188.72 | 6 | – | 0.0000 | 2 nuclei,merger |
| | B | 191.77 | – | 20.23 | 0.0005 | |
| 03117+4151 | A | 141.68 | 6 | 4.55 | – | merger |
| | B | 193.94 | – | – | – | |
| | C | 304.02 | – | – | – | |
| (05084+7936) | | 339.92 | 4 | 104.78 | – | |
| (05414+5840) | | 93.36 | 2 | – | – | |
| (06538+4628) | | 133.21 | 6 | 7.25 | – | merger |
| 07063+2043 | A | 103.00 | 5 | – | 0.0000 | disturbed,pair |
| (07062+2041) | B | 103.00 | 5 | 48.34 | 0.0001 | |
| (07256+3355) | A | 85.10 | 4 | – | 0.0000 | pair |
| | B | 79.67 | – | 79.45 | 0.0009 | |
| | C | 163.23 | – | – | – | |
| 08354+2555 | | 110.17 | 6 | 6.63 | – | merger,tails |
| 08507+3520 | A | 340.22 | 6 | – | 0.0000 | 3 nuclei,merger,antemna |
| | B | 347.61 | – | 46.99 | 0.0012 | |
| | C | 345.15 | – | 66.00 | 0.0008 | |
| (09047+1838) | | 177.92 | 6 | – | – | merger |
| 09126+4432 | A | 243.16 | 6 | – | 0.0000 | 3 nuclei,merger |
| | B | 241.94 | – | 13.56 | 0.0001 | |
| 09168+3308 | | 310.32 | 2 | – | – | |
| 09320+6134 | | 247.49 | 6 | – | – | tail |
| 09333+4841 | A | 162.07 | 4 | – | 0.0000 | close pair |
| | B | 156.61 | – | 48.40 | 0.0009 | |
| (09517+6954) | | 12.25 | 4 | – | – | group |
| 10203+5235 | | 200.59 | 0 | – | – | |
| (10311+3507) | | 439.45 | 4 | – | – | |
| (10565+2448) | | 263.47 | 6 | 10.86 | – | 2 nuclei,merger |
| 11231+1456 | A | 209.92 | 4 | – | 0.0000 | pair |
| | B | 206.87 | – | 72.29 | 0.0005 | |

**Table 3** –Continued

| IRAS | | Distance (Mpc) | Morphological classification | Proj. Sep. ( kpc ) | Redshift difference | Comments |
|---|---|---|---|---|---|---|
| (1) | | (2) | (3) | (4) | (5) | (6) |
| 11254+1126 | | 252.39 | 0 | – | – | |
| 11257+5850 | A | 69.31 | 6 | – | 0.0000 | 2 nuclei,merger |
| | B | 68.10 | – | 7.52 | 0.0002 | |
| 11543+0124 | | 245.15 | 2 | 165.68 | – | group? |
| (12112+0305) | A | 446.98 | 6 | – | 0.0000 | 2 nuclei,merger,group |
| | C | 457.53 | – | 310.34 | 0.0017 | |
| 12120+6838 | A | 372.91 | 6 | – | 0.0000 | 2 nuclei,merger,group |
| | C | 379.70 | – | 50.70 | 0.0009 | |
| | D | 367.97 | – | 30.33 | 0.0008 | |
| 12251+4026 | | 231.39 | 0 | – | – | |
| 12265+0219 | | 981.92 | 0 | – | – | |
| 12323+1549 | A | 28.77 | 0 | – | – | no association with B |
| | B | 283.16 | – | – | – | |
| 12540+5708 | | 262.58 | 6 | 14.93 | – | merger |
| 12592+0436 | | 231.07 | 6 | – | – | disturbed |
| 13136+6223 | A | 192.46 | 6 | – | 0.0000 | 2 nuclei,merger,bridge,tails |
| | B | 191.85 | – | 31.62 | 0.0001 | |
| 13183+3423 | | 144.59 | 6 | – | – | tails |
| 13299+1121 | | 197.24 | 0 | – | – | |
| 13362+4831 | A | 177.95 | 6 | – | 0.0000 | 2 nuclei,merger |
| | B | 174.91 | – | 7.93 | 0.0005 | |
| 13373+0105 | A | 139.81 | 5 | – | 0.0000 | pair,strong interaction,bridge |
| | B | 137.39 | – | 55.48 | 0.0004 | |
| 13428+5608 | | 232.89 | 6 | – | – | tail |
| 13458+1540 | A | 359.53 | 6 | – | 0.0000 | 2 nuclei,merger |
| | B | 356.45 | – | 22.91 | 0.0005 | |
| 13496+0221 | A | 201.44 | 6 | – | 0.0000 | 2 nuclei,merger,tail,group |
| | B | 210.58 | – | 22.91 | 0.0015 | |
| | C | 197.78 | – | – | – | |
| 13536+1836 | | 312.42 | 6 | – | – | disturbed |
| 14151+2705 | A | 232.25 | 5 | – | 0.0000 | 2 nuclei,merger |
| | B | 228.58 | – | 34.48 | 0.0006 | |
| 14178+4927 | | 162.35 | 0 | – | – | |
| 14547+2448 | A | 210.89 | 6 | – | 0.0000 | 2 nuclei,merger |
| | B | 199.31 | – | 35.65 | 0.0019 | |
| 14568+4504 | | 225.72 | 6 | 10.60 | – | merger |
| 15107+0724 | | 80.97 | 0 | – | – | |
| 15163+4255 | | 251.36 | 6 | 8.49 | – | 3 nuclei,merger |
| 15327+2340 | | 112.43 | 6 | 4.08 | – | 2 nuclei,merger |
| 15425+4114 | A | 201.00 | 6 | 9.45 | 0.0000 | disturbed,pair |
| 15426+4116 | B | 201.00 | 6 | – | 0.0001 | disturbed,pair |
| 16104+5235 | | 185.51 | 6 | 5.05 | – | disturbed,tail |
| 16180+3753 | | 190.70 | 2 | 125.74 | – | |
| 16284+0411 | | 152.51 | 6 | 44.24 | – | disturbed |

**Table 3** –Continued

| IRAS (1) | | Distance (Mpc) (2) | Morphological classification (3) | Proj. Sep. ( kpc ) (4) | Redshift difference (5) | Comments (6) |
|---|---|---|---|---|---|---|
| 16504+0228 | | 150.98 | 6 | – | – | serious disturbed |
| 16577+5900 | A | 119.76 | 4 | – | 0.0000 | $\geq$ 1 component |
| | B | 117.94 | – | 51.81 | 0.0003 | |
| 16589+0521 | | 309.35 | 3 | – | – | |
| 17366+8646 | | 167.82 | 6 | 9.68 | – | 4 nuclei,merger,bridge,tail |
| 17392+3845 | | 251.24 | 4 | 95.87 | – | group? |
| 17501+6825 | A | 318.29 | 4 | – | 0.0000 | group ($\geq$ 6 members) |
| | B | 323.82 | – | 47.24 | 0.0008 | |
| | C | 315.83 | – | 123.90 | 0.0004 | |
| | D | 315.83 | – | 116.09 | 0.0004 | |
| 18525+5518 | | 304.97 | 3 | 38.46 | – | |
| 18595+5048 | | 170.37 | 0 | – | – | |
| 19120+7320 | A | 157.73 | 4 | – | 0.0000 | pair |
| | B | 157.13 | – | 50.25 | 0.0001 | |
| 20550+1656 | | 219.35 | 6 | 10.12 | – | 3 nuclei,merger |
| 22388+3359 | | 129.80 | 0 | – | – | |
| 22501+2427 | | 254.07 | 6 | – | – | disturbed |
| 23007+0836 | A | 97.13 | 4 | – | 0.0000 | pair |
| | B | 97.13 | – | 37.46 | 0.0000 | |
| 23024+1916 | | 146.08 | 1 | – | – | |
| 23135+2516 | | 165.98 | 0 | – | – | |
| 23254+0830 | A | 179.15 | 4 | – | 0.0000 | group |
| | B | 176.11 | – | 120.47 | 0.0005 | |
| | C | 210.21 | – | – | – | |
| | D | 170.64 | – | 53.72 | 0.0014 | |
| 23488+1949 | A | 87.90 | 5 | – | 0.0000 | 2 nuclei,merger,group |
| | B | 86.69 | – | 27.44 | 0.0002 | |
| | C | 90.92 | – | 143.88 | 0.0005 | |
| 23488+2018 | A | 109.71 | 4 | – | 0.0000 | $\geq$ 1 component |
| | B | 109.71 | – | 62.48 | 0.0000 | |
| 23532+2513 | A | 356.96 | 6 | – | 0.0000 | 2 nuclei,merger,group |
| | B | 348.95 | – | 46.59 | 0.0130 | |
| | C | 350.18 | – | 139.69 | 0.0011 | |
| 23594+3622 | | 193.33 | 0 | – | – | |

**Notes:**

$\star$ Here adopt $H_0 = 50 kms^{-1}Mpc^{-1}$ and $q_0 = 0.5$.

$\star$ Morphological classification in column (3) (Lawrence et al., 1989):
*0*: isolated; *1*: distant faint companion; *2*: distant bright companion; *3*: near faint companion; *4*: near bright companion; *5*: interacting pair; *6*: merger or highly peculiar.

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