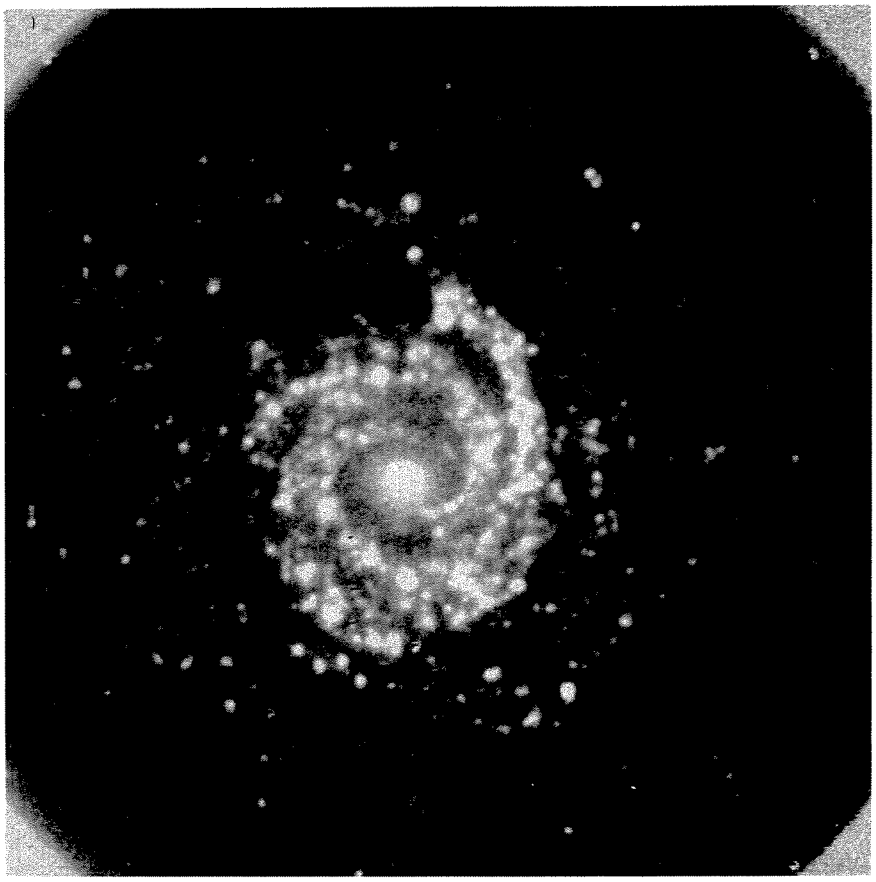

Figures 16a and 16b

"Bimodal" Star Formation in the Spiral Galaxy NGC 6814

The galaxy NGC 6814 has been observed with the PALILA focal reducer in simple imaging mode in August 1991. This galaxy is part of a sample of starburst/AGN galaxies that are observed (by R.A.) to study the morphology of the nuclear starburst regions. The morphological type of NGC 6814 is SAB(rs)bc and we assumed a distance of 22.8 Mpc.

Frames have been taken in the light of the Hα and [NII]6584 Å lines and neighboring continuum emission. Three frames of 20 minutes for the line emission and 3 times 15 minutes for the continuum. With a camera focal ratio of f/2 and a 3.6 m telescope in good seeing conditions the images are very deep. A rough flux calibration of the Hα +[NII] image has been done using the calibrated emission from the nucleus. The error on this calibration is large since it depends a lot on an adequate subtraction of the continuum image (very peaked nucleus), and furthermore, the line emission in the nucleus is variable (error ~50 %). However, it provides an upper limit to the flux and surface brightness of the HII regions. At the time of this writing a calibrated image of this galaxy has been obtained and will allow a more accurate flux calibration of the objects.

After standard reduction of the data (bias subtraction and flat fielding) a rather unexpected result revealed itself; an important population of faint HII regions, at large radius from the center of the galaxy. Figure 16a shows the pure Hα emission (continuum subtracted) of the galaxy, while figure 16b shows the continuum emission. One sees that these faint HII regions are located outside the optical disk of the galaxy, as defined by the continuum image. A "manual" identification of the HII regions has been carried out and is probably complete at large radius but not at smaller radius. The reasons being that the high surface density of objects and presence of bright HII regions prevent the detection of fainter ones.

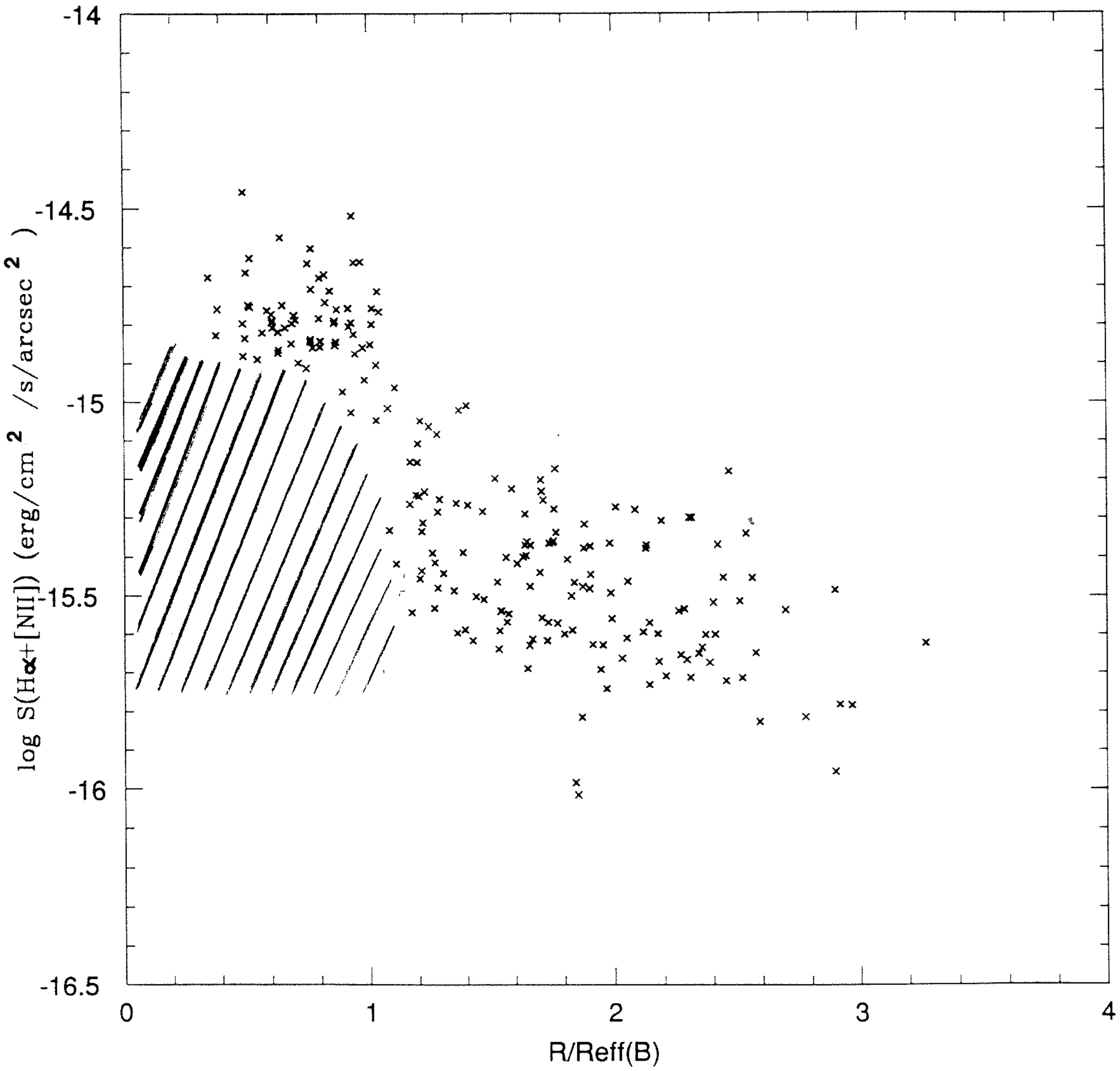

Figure 17

Figure 17 shows a plot of the average surface brightness of a non-complete sample of HII regions in the galaxy. The hatched area on the plot is certainly not empty of HII regions but rather reflects the detection problem mentioned earlier. Nevertheless, an important transition is observed at one effective radius from the center of the galaxy. The upper envelope of the surface brightness distribution of the HII regions drops abruptly by a factor of 4.

This is, to our knowledge, the first time that such an effect is observed in a galaxy. Further work is required to understand this phenomenon, but a viable hypothesis is that this surface brightness change reflects the difference between stochastic star formation and spiral density wave induced star formation. Indeed, no high surface brightness HII regions are found at large radii, outside the disk where the spiral wave is strongly defined. On the other hand, low surface brightness HII regions are found everywhere. This illustrates the strong link between spiral structure and the level of massive star formation.

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Questions and comments about the Bulletin should be sent to the attention of **Dr. Robin Arsenault** at CFHT.

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