Spiral Structure and Star Formation in the Galaxy NGC 6814

Jean-Rene Roy\textsuperscript{1}, Robin Arsenault\textsuperscript{2}

\textsuperscript{1} Université Laval, Québec, Canada
\textsuperscript{2} Canada-France-Hawaii Telescope, Kamuela, Hawai, USA

Deep H\textalpha{} + [N II] imagery was obtained of the grand design spiral galaxy NGC 6814 with the Canada-France-Hawaii 3.6 m telescope. 206 H II regions were identified as far as three effective radii (R\textsubscript{eff}), and their total H\textalpha{} + [N II] flux and mean surface brightness were measured. One clearly distinguishes two populations of H II regions when examining the nebular line image, and inspecting the plot of S(H\textalpha{} + [N II]) as a function of galactocentric distance. The population of high surface brightness H II regions is found in the inner regions (R \leq R\textsubscript{eff}) where the spiral arm pattern is well-developed. Beyond the spiral arms, S(H\textalpha{} + [N II]) drops suddenly, and the outer H II regions have surface brightness systematically fainter by at least a factor of 5. A decrease in density by a factor of 2 or 3 could account for the drop in surface brightness. The theory of density wave predicts that the passage of a galactic shock associated with the density waves gives rise to regions of high and low gas density with a contrast of about 2 or 3 to 1. The upper envelope of the total flux is a monotonically decreasing function of radius.