# ABSTRACT


A Study of Solar Active Regions
by Using Solid-State Photoelectric Photometer

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Photoelectric Photometry technique has been developed to study active regions, particularly sunspots, in the sun. Due to 11-year sunspot cycle, there have been many sunspots or sunspot groups observable.

The instruments used in this research are the 16-inch Cassegrain Reflecting Telescope of Chiang Mai University Observatory with a Solid-State Photoelectric Photometer which is a most suitable detector in solar photometric research. However, some systems of solar filter and magnifying optical part were developed so as to be able to observe sunspot by using the "Drift Scan" technique.

Profiles of color index and temperature of sunspots have been analysed so temperatures in solar photospheres, sunspots and light bridges were able to be interpreted. In this research, six sunspots have been analysed.

From temperature profiles of the observed sunspots, it was found that effective temperatures for each different spot are different ie. range from 4068.84-5255.67 °K while the average effective temperature of solar photospheres is 5567.50 °K. In determination of errors in the

analysis of effective temperature, the value of ± 183.96 $^{o}$K was found and indicated that the effective temperature in these two regions are significantly different.

From the analysis of ratio between radiation rates of sunspot umbra and photospherees, and also the analysis of sunspot umbral models compared with others. It was found that radiation rate, temperature, electron pressure, gas pressure at each optical depth of sunspots were influenced by strong magnetic fields inside sunspot itself.