

**SIGNAL TO NOISE RATIO OF THE IMAGE OF THE STAR CAPELLA
WITH RESPECT TO THE CCD TEMPERATURE**

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ABSTRACT

SIGNAL TO NOISE RATIO OF THE IMAGE OF THE STAR CAPELLA RESPECT TO CCD TEMPERATURE

This study focused on signal to noise ratio of the image of the star Capella with respect to CCD temperature. In this research we used Meade 8" LX200 GPS Telescope, SBIG ST-8XME CCD Camera and computer to link the telescope and CCD camera. We also used the computer software such as AIP Software to calculate signal to noise ratio and Sky6 Software to determine the star location and time. Signal comes from the number of photon striking the detector inside the CCD camera and liberated as electron. Noise is the uncertainty of the signal. It is present in all signal. There are some sources of noise which are dark current, bias current, bias current and thermal current. Once we grab an image, the image was recorded because the CCD receives the signal. The image looks grainy because of the noise and this is called raw image. Signal to noise ratio is the measure of the quality of the image. The better the image quality is the higher the signal to noise ratio of the star image. At lower temperature of the CCD camera from the noise of the dark current was reduced and signal to noise ratio is higher. Besides that, we also computed the magnitude of the star to determine the degree of the star brightness. The magnitude of the star is lower at lower temperature of the CCD. The lower the magnitude, the star is brighter. Finally, the image quality of the star is better when signal to noise ratio is high and the noise from dark current is reduced. The magnitude of the star is smaller at lower temperature.

CHAPTER 1

INTRODUCTION

1.1. Background

Astronomy was named by Greek as 'Astronomia'. It is combination of 'astron' and 'nomos', which is "law of the stars". This is the science object and phenomena that located outside the earth. Astronomy is one of the oldest sciences. Since 20th century, astronomy has split into observational astronomy and theoretical astrophysics. (Wikipedia, 2006).

Observational astronomy is acquiring data, which involves building and maintaining instruments as well as processing the result. Theoretical astrophysics is ascertaining the observational implications of computer or analytic models. (Wikipedia, 2006).

Astronomy is the study about the universe beyond the borders of our planet. This is one of the most exciting and rapidly changing branches of science. Astronomy is a wonderful hobby with many facets. It is based on observation not experiment. (Fraknoi, Morrison and Wolff, 2004)

There are many types of research that astronomer do such as photometry, astrometry and spectroscopy. Astrometry is just like the science of measuring the positions of