Distance Measurement of Delta Scuti Variable Stars

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We decided to do this research because we wanted to see how we could use the measured period and an apparent magnitude of variable Cepheid stars to measure their distance from Earth and thus prove that there is a connection between their period of changing brightness and their luminosity. To prove this connection, we used a telescope to record the periods of five Cepheids. Using some computer photometry tools, we extracted the necessary data from the images, and we also took extinction into account to determine the magnitudes in more detail. Then, using a formula to calculate the absolute brightness of the Cepheids over their periods and the measured apparent brightness, we determined their distances, which differs by less than 10% from three of the five Cepheid stars from the true value measured by the Gaia satellite via parallax, and for one of them we even obtained an identical distance. Using the data and the linearization of the function, we proved the relationship between the period and the Cepheid emission.