The evaluation Interstellar Extinction in the Milky Way Galaxy

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Abstract

This project studies the Interstellar Extinction in the Milky Way Galaxy along the galactic longitude 60, 50, 40, 30, 20, 10, 0, 350, 340, 330 320, 310, 300, 290 and latitude -30, -20, -10, 0, +10, +20, +30. Images of stars in optical were taken along the galactic coordinate and compare with the infrared images from database. Star density in optical and infrared above a cutoff magnitude of 15.0 were counted and compared. The amount of interstellar extinction is defined to be the relative number of stellar density in optical compared to infrared. The value of interstellar extinction is then normalized by comparing to the galactic center.

The amount of interstellar extinction is defined to be the relative number of stellar density in optical compared to infrared. The value of interstellar extinction is then normalized by comparing to the galactic center. The amount of interstellar extinction compared to the center of galaxy ranges from 0.1 to 1 around the galaxy. Interstellar extinction is found to be greatest near the galactic plane and decrease as we move away from the galactic latitude 0.

Introduction

Galaxy include many stars, gas, dust, and dark areas. Sometimes light from distant stars is blocked by interstellar dust, known as the interstellar extinction. So we want to study interstellar dust or the Interstellar Extinction. The evaluation Interstellar Extinction is to determine the dust in the Milky Way Galaxy. We begin by studying stars along the galactic coordinate, where zero longitude points at the center of the galaxy along the Sagittarius constellation and positive galactic latitude pointing towards the north pole of the galaxy, pointing towards Coma Berenices constellation. Since infrared radiation can pass through dust in the galaxy, we can study the real number of stars by looking in infrared. By comparing the number of stars seen through the dust in visible with the actual number of stars in infrared, we can calculate the amount of light blocked by the dust or the interstellar extinction.

Here, we can define the amount of interstellar extinction as the ratio of star density observed in visible compared to infrared. Then, we can normalize the value by comparing it with the interstellar extinction found in the center of milky way galaxy. Each galactic coordinate is then plotted to make a contour map of interstellar extinction along the galaxy.

Materials and Methods

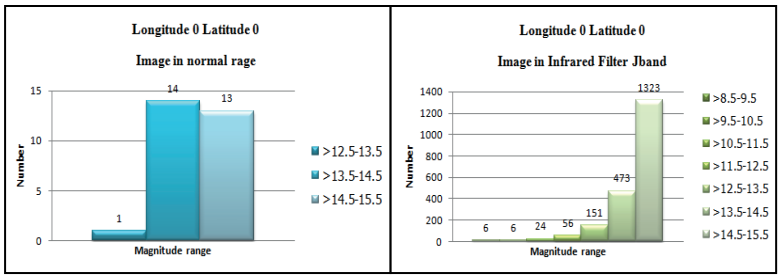
1. Photograph stars in the longitude of 60, 50, 40, 30, 20, 10, 0, 350, 340, 330, 320, 310, 300, 290, and latitude of -30, -20, -10, 0, +10, +20, +30 in an exposure time of 60 seconds and 120 seconds using filters open
2. Find the magnitude of the stars in each images for both the optical image taken, and from infrared database. The cutoff magnitude criteria is then set to the apparent magnitude of 15.00.
3. Find the value of the Interstellar Extinction by taking numbers of stars in the Infrared to minus numbers of stars in the visible in each location.
4. Bring the Interstellar Extinction in each location converts to a percentage compared with number of stars in the infrared and find this in each location compared with amount in the center of Milky Way galaxy.
5. Make contour plot graph for Interstellar Extinction in each location compared with Interstellar Extinction in center of Milky Way galaxy.

Results and Discussion

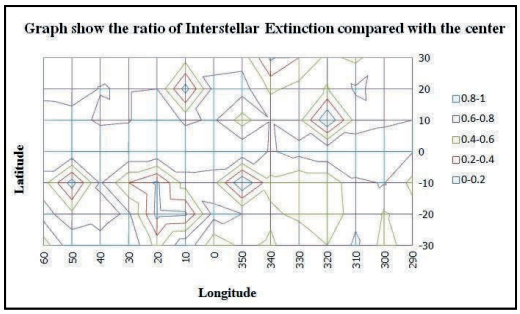
latitude	longitude													
	60	50	40	30	20	10	0	350	340	330	320	310	300	290
30	0.79	0.68	0.68	0.75	0.61	0.69	0.71	0.73	0.16	0.40	0.65	0.55	0.76	0.69
20	0.74	0.69	0.81	0.78	0.80	0.11	0.87	0.89	0.56	0.67	0.59	0.83	0.74	0.78
10	0.90	0.89	0.76	0.78	0.98	0.76	0.83	0.51	0.79	0.67	-	0.68	0.75	0.80
0	0.99	0.99	1	0.99	0.99	0.99	1	0.98	0.78	0.87	0.98	0.95	0.97	0.81

-10	0.69	0.10	0.83	0.40	0.16	0.70	0.66	-	0.54	0.43	0.43	0.77	0.81	0.54
-20	0.89	0.65	0.73	0.83	0.13	0.16	0.87	0.80	0.64	0.55	0.40	0.75	0.58	0.68
-30	0.49	0.95	0.86	0.98	0.52	0.97	0.45	0.65	0.56	0.76	0.60	0.84	0.52	0.70

Table 1.1 The value of relative interstellar extinction compared to the galactic center.



Graph 1.1 to see that magnitude of stars in the normal range increased from photographs taken by the Infrared. Which result of dust that obscured the stars.



Graph1.2 Contour plot showing the relative amount of interstellar extinction compared to the galactic center.

The amount of interstellar extinction is defined to be the difference in number of stars density seen in infrared and stars seen in optical, divided by total number of stars density seen in infrared. Both the number of stars include only stars with brightness greater than cutoff apparent magnitude of 15.0.

Graph 1.1 shows how the interstellar extinction affect the stars observed in visible, compared to stars seen in infrared. Table 1.1 and Graph 1.2 shows that the interstellar extinction is high in the vicinity of the area along the latitude 0. The amount of interstellar extinction decreases as we move away from the galactic plane.

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Conclusions

We have found that interstellar extinction caused the apparent magnitude of stars in visible to increase. Along the galactic coordinate, the amount of relative interstellar extinction varies from 0.1 to 1 with the interstellar extinction being greatest around the galactic latitude of 0 and decreasing as we move away from the galactic plane.

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