**Abstract**

RR Lyrae variable stars (RRL) are a common stellar candle for measuring large interstellar distances. Interstellar gas and dust between the target RRL and Earth absorb blue light, reddening the color and diminishing the intensity of starlight. To accurately determine distances to RRL within the plane of our galaxy, we must know the stars' intrinsic V-I color to correct for the interstellar dimming and reddening. Our research has clarified what this intrinsic color is, based on observations of nearby RRL that are affected only slightly by interstellar reddening. In the application flowchart below, we give an example for how our results can be used to determine distances to heavily reddened globular clusters.

**Procedural Flowchart**

1. Observe RRL magnitudes in low dust regions in V and I filters
2. Compute V-I value in minimum light period for each star
3. Correct for small reddening (COBE data) to get intrinsic (V-I)_0
4. Compute mean (V-I)_0 for 11 RRL stars

**Application Flowchart**

1. Observe the apparent V & I magnitudes of an RRL in the plane of the galaxy (as in #1 above)
2. Compute the apparent V-I color at minimum light for the RRL (as in #2 above)
3. Subtract off the intrinsic color of RRL (0.55 mag, from our study) to get the amount of reddening due to dust
4. Compute the amount of dimming due to the dust: it is proportional to the amount of reddening due to the dust
5. Compute the RRL’s luminosity (energy output) from the known period-luminosity relationship
6. Use the distance modulus formula to combine observed V magnitude (#1), amount of dimming (#4), and luminosity (#5) to find the RRL’s distance

**Example:** Distance to the globular cluster NGC 6539 containing a newly discovered RR Lyrae star:

- Estimate with reddening correction: **22,900 light years**
- Without reddening correction: **90,229 light years**