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SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Ignition - Primary Space Education (1)

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NOVAE DISTRIBUTION IN THE ANDROMEDA GALAXY: A SPRINGBOARD FOR ENGAGING YOUNG STUDENTS IN SPACE SCIENCE

Abstract

Elementary and middle level students can be engaged in space science through involvement in research and through innovative engagement strategies. The author of this abstract completed an astronomy research project on the Andromeda Galaxy in middle school. In addition to the scientific learning, the subsequent development of space science educational experiences for younger children provided to be an equally rewarding experience. The initial research was an analysis of novae rate with respect to location in the Andromeda galaxy and was conducted using images of the Andromeda galaxy taken from the WIYN 0.9 meter telescope on Kitt Peak. The Andromeda galaxy was divided into sixteen fields and rate of novae was compared between fields. A comparison was made between the 12 outer fields (spiral arms) and the 4 inner fields (central bulge). Novae were found by "blinking" images of each field throughout 100 epochs of data. Blinking is a technique used to compare images of fields and noting brightness (via x,y coordinates) in one field that is not visible in the same field during a different epoch. Although the central bulge would be expected to contain more supernovae due to stellar density and proximity of stars to each other, analysis of data indicates that the greatest concentration of supernova appeared in outer regions. The most concentrated distribution of novae was in field 2 (upper left edge) with an average of 11.3 novae. The least novae were in area 7 (central right) with an average of 1.3 novae. Education and public outreach activities were developed that related not only to visible light, but also to infrared and ultraviolet light. Young children often have difficulty with concepts that are not tangible. Thus, models and immersive exploratory experiences can provide powerful learning opportunities for K-8 students. Innovative space science education experiences for young students include constructing a scale model of the Milky Way (a similarly shaped galaxy to Andromeda), ultraviolet investigations using ultraviolet beads that turn colors in the presence of ultraviolet light, infrared sensing tools, spectrometers, and models of the blinking technique used to quantify novae in Andromeda. All of these activities share the trait of accessibility to young students, tangible opportunities for observation, inspiration for our youngest innovators, and hands-on opportunities to explore what is normally an out-of-reach concept for young students.