

Capturing the Northern Lights: The use of television cameras to measure and study aurora

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The colorful, dancing lights of the northern and southern aurora have fascinated scientists, but because of their evolving and fleeting nature, they have eluded detailed study by most of our observational instrumentation. The visual observer could not draw or paint the aurora fast enough to capture their ethereal nature. In 1892, German astronomer Martin Brendel was the first to photograph the aurora and, within the decade, scientists established large-scale observational programs in attempt to photograph this brilliant phenomenon. However, while photographs could reveal new details about the structure of aurora, photographic emulsion was not practical for the aurora's weak, moving light sources.

The rapid development of commercial television cameras, beginning in the 1940s, led to the emergence of low-light level detectors, based on television cameras, which were subsequently employed by astronomers to study various cosmic phenomena. By the early 1960s, astronomers began using commercial-grade television cameras and image-intensifier cameras to gain a better understanding of the detailed structure, change in shape and form type, and the various types of motion demonstrated by aurora. Television cameras helped reveal, for example, that the homogenous auroral arc (HA) was not as their name implied, homogenous, but was actively moving and changing form when viewed at a faster rate than the photographic emulsion or human eye could detect. Though aurora are still difficult to observe, television cameras ushered in a new era of understanding the elusive nature of aurora.

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