

The Durations of Starbursts in Blue Compact Galaxies

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Abstract

The starburst phenomenon is a very important phase of galaxy evolution, and especially so for dwarf galaxies. The duration of the burst is important because it impacts both the evolution of the galaxy itself and the evolution of the local environment external to the galaxy. In addition to the physical conditions and evolution of the galaxy, the length of the burst and degree of "burstiness" affects the detectability of low luminosity galaxies. There is no consensus in the literature on the typical duration of a burst in a dwarf galaxy; some studies favor durations of roughly 5 Myr, and others roughly 100 Myr. We propose to resolve this discrepancy.

The HST archive contains high quality imaging observations of a number of nearby starbursts in dwarf galaxies (often called Blue Compact Dwarf galaxies or BCDs). However, these have been obtained through a number of diverse investigations focusing on a wide variety of science questions. Here we propose a systematic, uniform analysis of these nearby BCDs that will produce star formation histories (SFHs) with a primary goal of determining the duration of the burst. Specifically, we will: (1) reduce the photometry in a uniform manner using programs optimized for HST observations, (2) use two of the most sophisticated programs available to derive optimal star formation histories from the resulting color-magnitude diagrams, including modeling of the effects of differential extinction, and (3) compare these results and conduct Monte Carlo simulations in order to securely quantify the uncertainties in the derived star formation rates. This approach will allow us, for the first time, to compare the results for a significant sample in a uniform and unbiased way, and thus, draw unambiguous conclusions regarding the duration of starbursts in BCDs.

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Dataset Summary:

Instrument	No. of Datasets	Retrieval Method	Retrieval Plan
ACS	36	FTP	roughly half already retrieved; rest will be done soon
WFPC2	43	FTP	roughly half already retrieved; rest will be done soon