

# CORRELATIONS BETWEEN $UBV$ COLORS AND FINE STRUCTURE IN E + S0 GALAXIES

François Schweizer  
 Carnegie Inst. of Washington  
 5241 Broad Branch Rd. NW  
 Washington, DC 20015

Patrick Seitzer  
 Space Telescope Science Institute  
 3700 San Martin Drive  
 Baltimore, MD 21218

A study of 67 E and S0 galaxies located mostly in the field and in groups reveals that at any given luminosity the  $UBV$  colors become systematically bluer as the amount of fine structure (ripples, jets of luminous matter, X-structure, and boxy isophotes) increases. Figure 1 shows the resulting correlations between the color residuals  $\Delta(U-B)_{e,0}$ ,  $\Delta(B-V)_{e,0}$  (calculated as deviations from the mean color-luminosity relations) and the fine structure parameter  $\Sigma$ . These correlations closely resemble correlations found earlier between CN,  $Mg_2$ , and  $H\beta$  line strengths and the same parameter  $\Sigma$  in 36 ellipticals (Schweizer *et al.*, Ap.J. Letters **364**, L33, 1990). Both sets of correlations are most likely due to systematic variations in mean age, rather than mean metallicity, of the stellar populations in these early-type galaxies. We model the evolution of galaxies undergoing a major merger by convolving a single-burst model (Charlot & Bruzual, Ap.J. **367**, 126, 1991) with a star formation rate that declines exponentially with a long time constant (6–10 Gyr) before the merger and with a short time constant (0.1–0.5 Gyr) afterwards. Some of the model parameters are determined from observations of two 1–2 Gyr old merger remnants. Comparisons between the observed  $UBV$  colors and the models suggest that the bluest E + S0 galaxies in our sample formed through mergers only a few billion years ago, which also explains their high amount of fine structure.

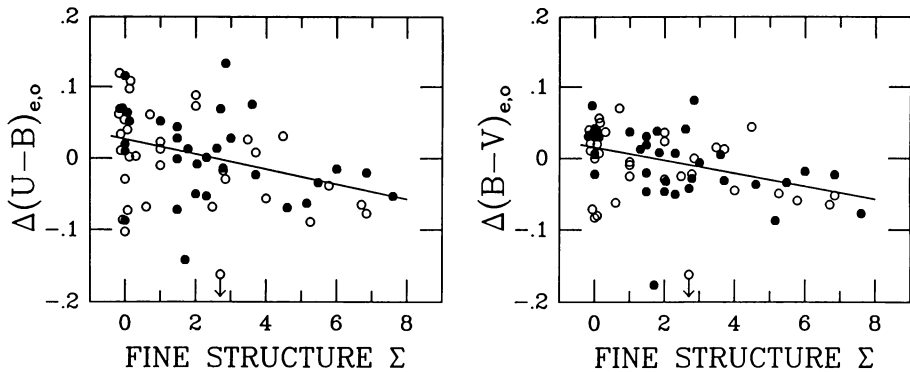


Figure 1. Color residuals  $\Delta(U-B)_{e,0}$  (left) and  $\Delta(B-V)_{e,0}$  (right) plotted versus the fine-structure parameter  $\Sigma$ . Dots mark E galaxies, circles S0 galaxies.