

7 : ELLIPTICAL GALAXIES

(7.1) Introduction

- (a) The Myths
- (b) Subdividing the Elliptical Class
- (c) Parameters
- (d) Deprojection
- (e) Observational Concerns

(7.2) Radial Light Profiles : Fitting Functions

- (a) deVaucouleurs ($R^{1/4}$) and Sersic ($R^{1/n}$) Laws
- (b) Hubble-Reynolds Law
- (c) Modified Hubble, Isothermal and King Laws
- (d) Dehnen Law (w. Hernquist and Jaffe Laws)
- (e) Central Regions : the "Nuker" Profile

(7.3) Radial Light Profiles : Resulting Fits

- (a) Outside the Center
 - (i) Variation with Luminosity
 - (ii) Variation with Environment
 - (iii) cD galaxies
 - (iv) Dwarf Ellipticals
- (b) Central Light Profiles

(7.4) Correlations Between Parameters

- (a) Early 2-Parameter Correlations
 - (i) Color-Magnitude and Similar Correlations
 - (ii) Size & Luminosity vs Surface Brightness
 - (iii) Luminosity vs Velocity Dispersion
- (b) The 3-Parameter Fundamental Plane (F-P)
 - (i) $\log R_e$, $\langle \Sigma_e \rangle$, $\log \sigma_0$
 - (ii) The $D_n - \sigma$ relation
 - (iii) Kappa Space : κ_1 κ_2 κ_3
 - (iv) Physical Basis of the F-P
 - (v) Use of F-P in Distance Measurement
- (c) Core Parameter Correlations
 - (i) Pre-HST Results
 - (ii) Post-HST Results

(7.5) The Shape of Elliptical Galaxies

- (a) 3-D Shapes**
- (b) Isophote Shapes**
- (c) Ripples and Shells**

(7.6) Kinematics of Elliptical Galaxies

- (a) Methods of Analysis**
 - (i) Fourier Quotient**
 - (ii) Cross Correlation**
 - (iii) Other Methods**
- (b) Amount of Rotation**
 - (i) Expectations (pre-1975)**
 - (ii) Results**
- (c) Axis of Rotation**
- (d) Kinematically Decoupled Cores**

(7.7) Mass to Light Ratios

- (a) Inner Parts**
- (b) Outer Parts & Halo**

(7.8) Two Kinds of Ellipticals : Boxy and Disky

(7.9) Formation of Ellipticals

- (a) Two scenarios discussed**
 - (i) Monolithic Dissipative Collapse**
 - (ii) Hierarchical Mergers**
- (b) Relevant Issues & Problems**
 - (i) The Need for Dissipation (loss of energy)**
 - (ii) Observational Support for Mergers**
 - (iii) Theoretical Support for Mergers**
 - (iv) Problems to Overcome**
- (c) Merger Induced Dissipational Collapse**