

15 : ACTIVE GALACTIC NUCLEI

(15.1) Introduction

- (a) Operational Definition of AGN
- (b) Reasons for Studying AGN

(15.2) The AGN Paradigm

(15.3) AGN Taxonomy

- (a) Four Basic Criteria
- (b) Taxonomic Table
- (c) Mixed Classifications
- (d) Emission Line Classification

(15.4) Brief Historical Sketch

- (a) Early Optical Spectroscopy
- (b) Early Radio Observations
- (c) Quasar Discovery
- (d) The Redshift Controversy

(15.5) AGN Detection and Identification

- (a) Radio Surveys
- (b) Optical Colors
 - (i) Single Color
 - (ii) Multi-color
- (c) Slitless Spectroscopy
 - (i) Markarian Survey
 - (ii) Other Slitless Surveys
- (d) Emission Lines
- (e) Infra-Red
- (f) X-ray & Gamma-ray
- (g) Variability & Proper Motion

(15.6) AGN Demographics

- (a) Frequency of AGN in the Local Galaxy Population
- (b) AGN Preference for Big Bulges
- (c) Higher Luminosities

(15.7) AGN Unified Schemes

- (a) Two Different Angle-Dependent Phenomena

- (b) Seyfert 2s / Seyfert 1s**
 - (i) NLR/ENLR Shapes**
 - (ii) NLR vs Nuclear Luminosity Comparison**
 - (iii) $Q(\text{nuc})$ from NLR Radiation Parameter**
 - (iv) Periscopic (Polarization) View of the Nucleus**
 - (v) Nuclear Absorption: X-ray Spectra**
 - (vi) Nuclear Absorption: Molecular Masers**
 - (vii) Opening Angle**
 - (viii) Do All Seyfert 2s have Seyfert 1 Nuclei?**
- (c) NLRGs / BLRGs**
- (d) Radio Loud: PRG-II / LD-QSR / CD-QSR**
- (e) RG-I / BL-Lacs : straight down the beam**
- (f) Intrinsic Differences: Luminosity & Radio Loudness**

(15.8) Accretion Power

- (a) Eddington Luminosity & Growth Rate**
- (b) Thin Accretion Disks**
- (c) Accretion Efficiency: The Inner Radius**
 - (i) Newtonian Point Mass Potential**
 - (ii) Schwarzschild (Non-Rotating) Potential**
 - (iii) Rotating Black Holes**
- (d) Feeding the Disk**
 - (i) Nuclear ISM**
 - (ii) Tidally Disrupted Stars**
- (e) Extracting Rotational Energy?**
- (f) Inevitability of Black Hole Formation**

(15.9) Continuum SEDs

(15.10) Emission Line and Ionized Cloud Physics

(15.11) The Broad Line Region

(15.12) The Narrow Line Region

(15.13) Intrinsic Absorption Lines

(15.14) AGN Radio Properties : Cores, Jets, Lobes

(15.15) AGN Host Galaxies and Environment

(15.16) AGN Evolution