

Syllabus

Name of the tutor for a given session is in brackets, with email address.

Sessions are Tuesdays 10:30am – 11:30am, in the ROE lecture theatre, unless tutor agrees a different 1-hr slot

Texts:

Binney & Merrifield, Galactic astronomy
Dyson & Williams, The physics of the interstellar medium
Jackson, Classical electrodynamics (3rd [SI] edition)
Lena, Observational astrophysics
Longair, High-energy astrophysics (2nd edition: 2 vols)
Peacock, Cosmological physics
Phillipps, The physics of stars
Press et al., Numerical recipes (2nd edition)
Rybicki & Lightman, Radiative processes in astrophysics

Dates and topics:

Date: October 18 [Eric Tittley, ert@roe.ac.uk]

Topic: Astronomical signals

Jargon: Fourier transform; sampling; Nyquist frequency; aliasing; convolution; FFT; filtering; signal-to-noise

Reference: Press p490-499 and 530-535 (Fortran edition. Add about 7 pages for the C edition); Lena p81-95 and p116-140

Date: October 25 [Philip Best, pnb@roe.ac.uk]

Topic: Astronomical measurements

Jargon: Celestial coordinates; parallax; proper motion; magnitudes; colours; K-corrections

Reference: Binney & Merrifield p26-61

Date: November 1 [Jim Dunlop, jsd@roe.ac.uk]

Topic: Radiation basics

Jargon: specific intensity; surface brightness; Planck function; Einstein coefficients; radiative transfer; optical depth; scattering; extinction

Reference: Rybicki & Lightman p1-39

Date: November 8 [Catherine Heymans, cech@roe.ac.uk]

Topic: Detectors and spectrographs

Jargon: shot noise; dark current; flat field; background limit; noise temperature; brightness temperature; diffraction grating; blaze

Reference: Longair Vol 1 p237-260; Lena p274-308

Date: November 15 [Alan Heavens, afh@roe.ac.uk]

Topic: Matter & radiation

Jargon: ideal gas; degeneracy pressure; radiation pressure; Saha equation

Reference: Phillipps ch2

Date: November 22 [Ken Rice, wkmr@roe.ac.uk]

Topic: Star-forming regions

Jargon: outflows; ambipolar diffusion

Reference: Dyson & Williams ch8

Date: November 29 [John Peacock, jap@roe.ac.uk]

Topic: Line radiation

Jargon: recombination; forbidden lines; critical density; ionization parameter; doppler width; voigt profiles; curve of growth

Reference: Rybicki & Lightman ch10; Peacock p361-365 and 429-430

Date: December 6 [Bob Mann, rgm@roe.ac.uk]

Topic: Energy generation & transport in stars

Jargon: pp chain; CNO cycle; Gamow peak; opacity

Reference: Phillips ch4

Date: December 13 [Tom Kitching, tdk@roe.ac.uk]

Topic: Statistics and data modelling

Jargon: distribution function; central limit; variance; standard error; skewness; chi-squared; KS test; correlation; rank test; maximum likelihood; covariance matrix; confidence limits

Date: January 10 [Avery Meiksin, aam@roe.ac.uk]

Topic: Stellar structure and evolution

Jargon: hydrostatic equilibrium; virial theorem; radiative diffusion; main sequence

Reference: Phillips ch5; Longair Vol 2 p52-91

Reference: Press p603-619, p630-635, p650-662, 684-693 (Fortran edition. Add about 7 pages for the C edition); Lena p96-115

Date: January 17 [Ross McLure, rjm@roe.ac.uk]

Topic: Active galaxies

Jargon: Seyferts; UVX; blazars; broad and narrow lines; superluminal motion; unification and tori; Magorrian relation; thin disks; accretion efficiency; Eddington limit

Reference: Peacock ch14; Longair ch16

Date: January 24 [Andy Taylor, ant@roe.ac.uk]

Topic: Observational cosmology

Jargon: RW metric; comoving distance; Friedmann equation; density parameter; luminosity distance

Reference: Peacock p65-92