6.19

A Comparison of Observational and Theoretical Masses of Binary Wolf-Rayet Stars

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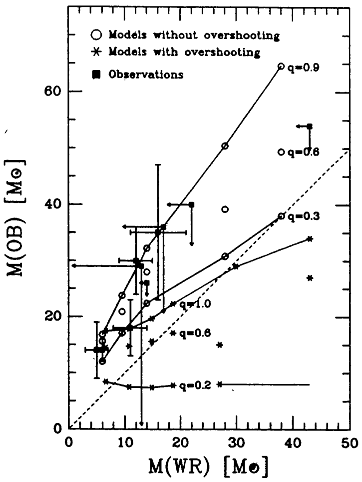
Recent polarimetrically determined orbital inclinations, i, allow for the first time the derivation of the true masses of Wolf-Rayet stars and their OB star companions. The masses are compared to theoretical models for binary evolution in the Figure below, where the WR star masses are plotted against the OB star masses.



While Vanbeveren's (1987, Astr.Ap.**182**, 207) models (shown by open circles) involve non-conservative mass transfer and Schwarzschild's criterion for convection, Doom and de Grève's (1983, Astr.Ap. **120**, 97) models (the stars) use conservative mass transfer and convective-core overshooting formulated in mixing-length theory. The ZAMS mass ratios, q, are given to the right of each sequence of models (where appropriate). The filled squares indicate the observed masses for 10 WR binaries. Five systems are shown with errorbars. For five more systems, the squares are plotted at the best positions and arrows indicate the differences to the minimum masses, $M\sin^3 i$.

Good agreement is found between the observational masses and the non-conservative models with classical cores.

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6.20

The H-R Diagrams of the Magellanic Clouds

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We have constructed an H-R diagram for luminous, hot stars in both the Large and Small Magellanic Clouds, making use of all available spectroscopic and photometric data. There are over 1300 stars in the LMC and over 500 in the SMC. The conversion from observed quantities to log T_{eff} and bolometric magnitude makes use of new temperature determinations for O stars and B supergiants. The color excess was determined using the Johnson Q-method for the B stars and the intrinsic color relation for the O stars. The H-R diagrams show an unexpected "ridge" running roughly parallel to a line of constant absolute magnitude of about -6.5 mag. We speculate on the astrophysical meaning of this feature.

Session 7: Quasars, Seyferts & Blazars Display Session, Exhibit Hall

7.01

Galaxies Clustering Around QSOs with Z=0.9-1.5 and an Analysis of Blue Background Galaxies

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Deep direct CCD observations in Mould-Cousins R and I passbands have been obtained for the fields of 16 radio-loud QSOs with $0.9<z<1.5$. We find a statistically significant excess of galaxies within 15" of the quasars and brighter than R=23 and I=22 (probability of chance occurance $P<0.5\%$). These "excess" galaxies are redder in R-I than the field galaxies in the outer parts of the CCD images. This color difference, which has a 5% probability of occuring by chance, indicates that the "excess" galaxies are physically associated with the quasars, rather than members of foreground "lensing" groups. Assuming the excess galaxies are indeed associated with the corresponding QSOs, these galaxies are 0 to 2.3 magnitudes brighter in R than first-ranked galaxies are predicted to be and are therefore several magnitudes overluminous (H_0=50 km sec^{-1} Mpc^{-1}; q_0=0.0). Galaxy counts in the outer halves of our fields have been used to derive field galaxy counts as a function of magnitude to R=23 and I=22. The color-magnitude diagram for the background galaxies includes a large population (abount 10%) of faint (R≥22), very blue galaxies (R-I≤ 0.2). These objects are much bluer than Magellanic irregular galaxy at any redshift and may be galaxies undergoing initial formation. We find that strong line emission almost certainly must be present in the R passband to produce the colors observed. This population could be comprised of low redshift, low luminosity (H II region) galaxies of the type studied by French and/or higher redshift galaxies with strong [O II].

7.02

Weak Bump Quasars

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The recent emphasis on dominant ultraviolet continuum 'Big Bumps' in quasars has obscured the fact that Bump properties vary widely, and that there are objects in which no such component is evident.

The ultraviolet 'Big Bump' is the most striking feature in the continuum energy distributions of quasars. This Bump is part of a larger feature that extends through the optical and, probably, soft x-ray bands. The feature is thought to be a signature of thermal radiation from the accretion flow (disk?) at few tens of Schwarzschild radii from the central compact object (Malkan 1983 Ap.J. **268**,582, Bechtold et al 1987, Ap.J. **314**,699, and others). We shall present a study of the range of Big Bump strengths of a sample of X-ray and IUE observed quasars. We also have extensive infrared, optical, millimeter and radio data on these quasars.

In a minority of quasars (4 of the 44 in our continuum sample, 2 of 62 in the survey of Neugebauer et al 1987, Ap.J.Suppl. **63**,615) the Bump appears to be weak or absent. In the quasars with the weakest Bumps, there is no soft X-ray excess present - one would have been detected by Einstein if it had a similar strength to the soft excess in the strong Bump quasars. This effect strengthens the identification of the soft X-ray excesses with the high energy tail of the Bump component.

The weak Bump quasars cannot be explained by dust obscuration of the Bump, since the necessary reddening ($E_{B-V} \sim 0.2$) would produce associated X-ray absorption ($N_H \sim 10^{21}$ atoms cm^{-2}) which exceeds that allowed by observation. Further, for some of the objects the spectral shape is not the same as that of a Bump reddened using a standard extinction law. The weak Bump quasars offer new possibilities for studying quasars: we can examine the 'bare' non-thermal component in the UV and we can search for correlations with the presence and strength of other continuum and spectral line features.

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7.03

Ultraviolet, Optical, and Infrared Observations of GQ Comae

M. L. Sitko (U. Cincinnati)

Preliminary results of a 3 year long project to monitor the continuum variability of the quasar GQ Comae (0.12μm to 3.5μm) and the associated variability of the Lα and C IV lines are summarized. GQ Comae exhibited a two-fold increase in flux during a 100 day time span, followed by a decline taking over three times longer. The broad wings of both Lα and C IV responded quickly to the continuum increase, although the coarseness of the time