THE STELLAR CONTENT OF SCO OB2

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The study of the stellar content of nearby OB associations is important for understanding the Initial Mass Function, the study of differential age effects and for a better knowledge of the ambient radiation field, which plays an important role in the interpretation of measurements of gas and dust. Unfortunately, even for the nearest OB associations membership is known very poorly. In most cases no main sequence members of spectral type later than B5 are known. Membership determination using colour-magnitude diagrams suffers from the large intrinsic distance spread. The large angular extent on the sky of most associations makes proper motion measurements difficult to compare because of problems connecting photographic plates with different plate centers. In order to remedy this situation a consortium called SPECTER has been formed at Leiden Observatory. It has been granted observing time on the HIPPARCOS satellite for measuring proper motions of about 10000 candidate members of the OB associations within 600 pc of the Sun. Candidates were selected according to spectral type (not later than F8) apparent magnitude, and location. In anticipation of the HIPPARCOS results, SPECTER will gather a variety of other data. We have nearly completed a program aimed at obtaining VBLUW-photometry (Lub and Pel 1977) of all candidate stars visible from the Southern Hemisphere. Here we discuss the preliminary results for the association Sco OB2.

Sco OB2 (or Scorpio-Centaurus) is the nearest OB association, and it consists of three main subgroups: Upper-Scorpius (US), Upper-Centaurus Lupus (UCL) and Lower-Centaurus Crux (LCC). Membership based on proper motion data has been established only for stars earlier than B5 (Bertiau 1958). For US and UCL suspected members are known down to B9. The only significant remnant of the parent molecular cloud is the Ophiuchus Molecular Cloud Complex, with starformation still occurring in the ρ Oph region.

At present VBLUW-colours are available for a few thousand candidate stars in the three subgroups. As an example we show in Figure 1 a colour-colour diagram for UCL. Also plotted are the Zero Age Main Sequence and the best-fitting isochrone, both of which are calculated from the Maeder (1981) evolutionary tracks combined with Kurucz' (1979) model stellar atmospheres. The rapidly rotating stars (filled dots) are

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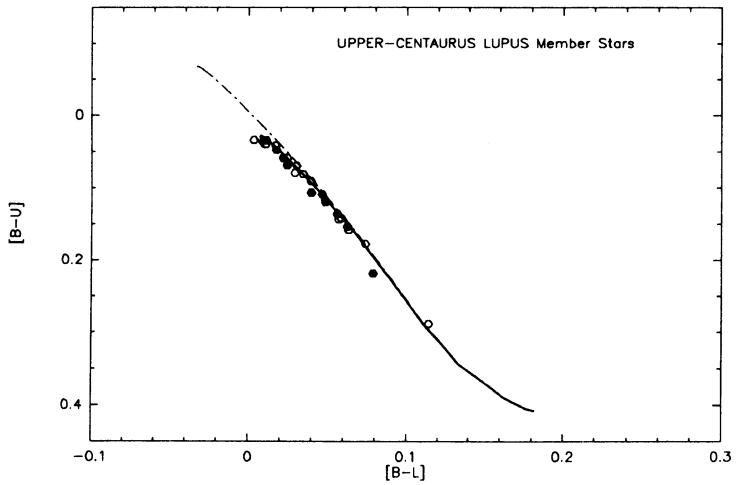

Figure 1. Colour-colour diagram of Upper-Centaurus Lupus member stars. Best fitting isochrone is drawn as a thick line, and the ZAMS as a dashed line. Stars with projected equatorial rotational velocity $v_e \sin i > 160$ km/sec are denoted by filled dots.

shifted away systematically from the main sequence. Taking this effect into account we find that all datapoints are consistent with a single isochrone. As a result, we do not find evidence for a relation between stellar mass and age. Recent claims to the contrary based on two other associations (Doom et al. 1985) are likely to be an artifact resulting from poor membership knowledge and the neglect of stellar rotation. The best estimates of the ages we derive are: US: 3-6 million years, UCL: 13-16 million years, LCC: 10-13 million years.

In the near future we plan to determine radial and rotational velocities of all early-type probable members in the associations. The radial velocities combined with the HIPPARCOS proper motion data will give us spatial motions of the stars. The rotational velocities combined with a theoretical study of the effect of rotation on the observed Walraven colours will enable us to make a more accurate age determination. These spectroscopic observations will also provide information on duplicity of the stars. Furthermore we will study the gas and dust in the association regions. CO observations of the Ophiuchus Molecular Cloud Complex have been made already with the 1.2 m Columbia-telescope at Cerro Tololo.

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