This quantity leads to the total amount of extinction. The observed brightness of the star can then be corrected for the extinction. Now we have to find the intrinsic luminosity of the star. The energy distribution of an early-type star is mainly determined by its temperature T and pressure p at the surface of the star. It is possible to make certain combinations of VBLUW colour indices that are insensitive to reddening. These are called reddening-free indices. The observed reddening-free indices can be compared with indices, calculated with theoretical spectra, as a function of T and p, of early-type stars (we used models by Kurucz). From this comparison we then find T and p of the star (for an application of this method to cool stars, see J. W. Pel, *The Messenger* **29,** 1, 1982). Now we use calculations of stellar evolution (for example by P. M. Hejlesen, *Astron. Astrophys. Suppl. Ser.* **39,** 347, 1980). These calculations give for a star with given mass its T, p and luminosity L as a function of time. We have determined T and p, so L follows. Since we now have the intrinsic luminosity of the star together with the observed brightness, corrected for extinction, the distance can be calculated.

Fig. 1 shows the results for stars along the line of sight to the planetary nebula NGC 2452. Only stars within 0.5 degree from the nebula are included. Many late-type foreground stars are not shown in the figure. The symbols used indicate the accuracy: thick dots are the better determined points (in terms of T and p). Individual distances have on average estimated accuracies of ~ 30 %, while individual reddenings are accurate to ~ $0^m_.03$ in E_{B-V}. Most of the scatter in this diagram is believed to be caused by multiple stars and an irregular reddening distribution across the field. The cross at 4.0 kpc with E_{B-V} = 0.49 represents the young open cluster NGC 2453, only 8'.5 away from NGC 2452. The circle with arrow at 7.3 kpc represents a lower limit to the distance of a very distant B2 supergiant. NGC 2452 has a reddening of $E_{B-V} = 0^m_.50 \pm 0^m_.05$. It is determined from the observed He II 1640 Å/4690 Å ratio and from the ratio of the radio to H_β flux density. From the relation in Fig. 1 we find a distance to NGC 2452 of ~ 4.1 kpc with an estimated accuracy of 25–30 %. Previous distance estimates by several authors range from ~ 1.5 to ~ 3.0 kpc, but with larger uncertainties.

This example shows that the "extinction method" is very powerful in deriving distances to planetary nebulae. Similar diagrams as Fig. 1 will be available soon for 12 other nebulae.

Large Scale Structure of the Universe, Cosmology and Fundamental Physics

As announced in the *Messenger* No. 30, this first ESO/CERN symposium will be held from 21 to 25 November 1983 at CERN in Geneva.

PROGRAMME

Introductory Lecture (D. W. SCIAMA, Oxford University and ISAS, Trieste).

Electroweak Unification and its Experimental Status (P. Darriulat, CERN, Geneva).

Unified Field Theories (P. FAYET, Ecole Normale Supérieure, Paris).

Experimental Tests of Unified Field Theories: Proton Decay and n-n̄ Oscillations (E. FIORINI, University of Milan); **Monopoles** (G. GIACOMELLI, University of Bologna).

Dynamical Parameters of the Universe (A. SANDAGE, Mount Wilson and Las Campanas Observatories, Pasadena, CA).

Radiation in the Universe (D. T. WILKINSON, Princeton University, NJ).

Galaxies (S. M. FABER, University of California, Santa Cruz).

Clusters, Superclusters and their Distribution (J. H. OORT, University of Leiden).

Formation of Galaxies and Structures (Ya. B. ZELDOVICH*, Institute of Applied Mathematics, Moscow).

Neutrinos (R. L. MÖSSBAUER, Technical University, Munich).

Early Nucleosynthesis (J. AUDOUZE, Institute of Astrophysics – CNRS, Paris).

Observational Evidence for the Evolution of the Universe (L. WOLTJER, ESO, Garching bei München).

Unified Field Theories and the Early Universe (A. D. LINDE*, Lebedev Physical Institute, Moscow).

Quantum Gravity (S. W. HAWKING, University of Cambridge).

Closing Lectures (J. ELLIS, Stanford University, CA, and CERN, Geneva); M. J. REES, University of Cambridge).

The following scientists will act as chairmen and discussion leaders of the various sessions: N. CABIBBO (University of Rome), G. COCCONI (CERN), A. D. DOLGOV* (Institute of Theoretical and Experimental Physics, Moscow), M. S. LONGAIR (Royal Observatory Edinburgh), A. SALAM (Imperial College and ICTP), E. E. SALPETER (Cornell University), D. N. SCHRAMM (Chicago University), J. SILK (IAP, Paris, and University of California, Berkeley), N. STRAUMANN (University of Zurich), H. VAN DER LAAN (University of Leiden).

* Participation has not yet been confirmed.

The aim of the symposium is to establish the status of our knowledge on the subject and to provide a forum for discussions among people from different disciplines. To this end about equal time will be dedicated to the formal lectures and to the general discussions on each topic. The audience will be mainly composed of about equal numbers of astrophysicists and particle physicists and will be limited to approximately 150 participants.
The participation in the symposium is by invitation only. People who are definitely interested in participating in the symposium should write to the chairmen of the Organizing Committee at the addresses below prior to 31st July 1983.

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