SCIENTIFIC NEWS

DISCOVERY OF THE LENSING GALAXY FOR THE TRIPLE QSO PG1115+080

The "triple quasar" PG1115+080 was observed February 17/18 with the CFHT RCA2 CCD at Prime Focus (PF). On this night, the seeing quality was estimated to be approximately 0.5 arc-seconds, as measured in 10- to 30-second focus exposures. The object was observed in the B, V, and R broad-band filters. The quasar has been measured numerous times at CFHT with several detectors and therefore it was of interest to compare the image scales measured previously with the predicted scale for the new detector. The R exposure was taken to examine the galaxies in the field near the quasar and to re-measure the apparent reddening of component B of the quasar itself. This component reportedly has redder colors than the other images, presumably due to the lensing galaxy (Young et al., 1981, Ap. J. 244, 723).

The combination of the excellent seeing conditions, the image scale at PF with RCA2, and the dynamic range of the detector allowed us to obtain a direct image of what is believed to be the lensing object of PG1115+080 (Figure 1). The lens is located 0.33 arc-seconds East and 1.35 arc-seconds South of component C. The position of the object agrees very favorably with the position reported by S. Shaklan and K. Hege (1986, Ap. J.); however, the CCD data shows a clear, well resolved image of the galaxy while previous data have only been indicative. The CCD data are consistent with the observations of P. Henry and J. Heasley (1986, Nature) taken in excellent seeing at the IFA 2.2-meter telescope last year. The new CFH images appear to be deeper than those taken in previous studies.

A point-spread function was fitted to the QSO components and subtracted from the CCD frame to estimate the brightness of the galaxy (Figure 2). The lensing galaxy has an R magnitude of approximately 20.2 with a (V-R) of about 0.70. The redshift of the galaxy, estimated from comparison with theoretical models, is most likely in the range $0.4 < z < 0.55$.

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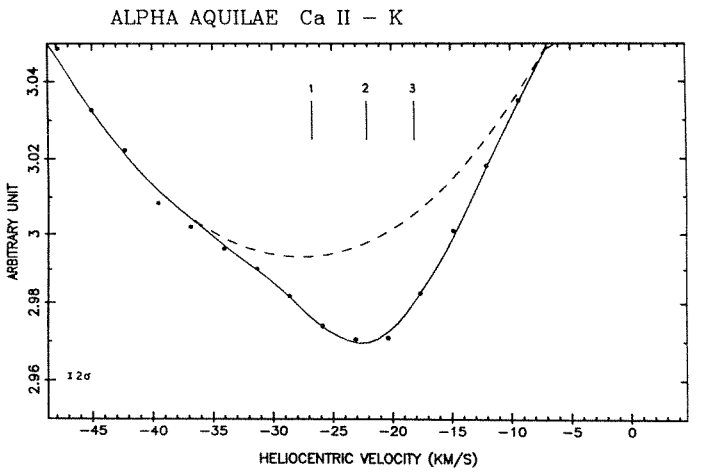
Figure 1

Figure 2

STRUCTURE EN VITESSE DU MILIEU INTERSTELLAIRE LOCAL

Des observations récentes couvrant tout le spectre électromagnétique allant de 21 cm aux rayons X ont apporté une richesse de données sur le milieu interstellaire (ISM) à moins d'environ 100 pc du Soleil. Cependant, ces informations se sont avérées difficiles à synthétiser en une image globale et cohérente des nuages locaux. D'autre part



LEGENDE DE LA FIGURE:

Meilleur profil de la raie interstellaire de Ca II-K observée vers Aquilae (Altaïr). L'absorption interstellaire apparaît au fond de la raie stellaire élargie par rotation. La largeur équivalente totale interstellaire est environ 1.7 m angstrom. Trois composantes sont détectées sur cette ligne de visée de 5 pc (Ferlet, Lallement et Vidal-Madjar, 1986, Astron. Astrophys., sous presse).

aussi, des raffinements théoriques ont été produits dans les modèles détaillés du ISM. Par conséquent, il est devenu vital de s'attacher à la compréhension observationnelle de la structure du ISM, aux abords du Soleil et sur des échelles de longueurs petites.

A l'heure actuelle, la seule façon d'atteindre ce but réside dans l'observation à partir du sol, à haute résolution spectrale et rapport signal sur bruit élevé. Ferlet et Vidal-Madjar (IAP, Paris) ont commencé un tel échantillonage des raies d'absorption interstellaires de Ca II et Na I vers beaucoup d'étoiles proches en utilisant le foyer Coudé avec le Réticon. Les premiers spectres de Ca II ont été interprétés avec une méthode de comparaison à des profils théoriques, et toutes les composantes mesurées ont servi de base à une analyse synthétique cinématique. Un exemple en est donné sur la figure dans le cas de la ligne de visée vers Altaïr, à 5 pc.

Quatre mouvements cohérents de matière sont détectés, et leur vecteur vitesse respectif calculé. Trois de ces "nuages" approchent le Soleil à moins de 5 pc, à moins de 20 pc pour le quatrième. La situation particulière du Soleil dans une région (relativement) dense est confirmée; la structure complexe et maintenant à condensation multiple de cette région de 5 à 20 pc est mise à jour. En comparaison, le volume allant de 20 à 100-150 pc semble être moins peuplé (Lallement, Vidal-Madjar et Ferlet, 1986, soumis à Astron. Astrophys.)

A SPECKLE INTERFEROMETRY SURVEY TO DETERMINE THE FRACTION OF CLOSE BINARIES AMONGST HUBBLE SPACE TELESCOPE GUIDE STARS

Shara (Space Telescope Science Institute), McAlister and Hutter (Georgia State) and Franz (Lowell) carried out a survey of a sample of 673 stars from the Yale Bright Star Catalog (BSC) using speckle interferometry to establish the binary star frequency within the sample. This effort was motivated by the need for a more observationally-determined basis for predicting the frequency of failure of the Hubble Space Telescope (HST) fine guidance sensors to achieve guide star lock due to duplicity.

The BSC stars are bright enough to yield very high signal-to-noise data, and close enough so that the CFHT diffraction limit is quite well matched to the HST fine guidance sensors' sensitivity range to close binary stars.

The chief astronomical result of this survey of 427 dwarfs and 246 evolved stars is the detection of 52 newly discovered binaries and measurements of 61 previously known systems. The frequency of close visual binaries in the separation range 0".04 to 0".25 is nearly three and one-half times that previously known.

The main functional result of this run is the determination that 20% of HST guide stars will be binaries which will prevent fine guidance sensor lock...twice the previous estimates. NASA, Lockheed and ST ScI are cooperating on the definition and design of necessary HST flight software changes to prevent substantial amounts of lost HST observing time due to binary guidestars.

Shara (ST ScI) wants to take this opportunity to publicly thank the CFHT director for his extremely strong support of HST. The planned improvements could not have been justified without the results of this run, which was partially composed of director's discretionary time.

A "side" benefit of this run was the continuous semi-quantitative monitoring of the seeing by inspection of the speckle frames. Seeing conditions were in general excellent with FWHM seeing disks estimated to be typically less than 0".7, occasionally less than 0".5, and only 2".0 under the worst seeing conditions encountered during part of the night of 8 July 1985 UT, when occasional cirrus clouds appeared. Of particular interest is the atmospheric redistribution or correlation time, found to be comparable to that these investigators have