GENERAL DISCUSSION

McALISTER: When asked to organize this session on interferometric techniques, it occurred to me that a unique opportunity would exist for interferometric observers to discuss points of common interest with observers using complementary techniques as well as with people who are looking carefully at the results of interferometry, particularly speckle interferometry. Thus I would like to invite your comments on aspects of interferometry that perhaps need improvement or further concentration.

Before opening up the discussion, let me first emphasize the need for modern spectroscopic observations of many of the binary stars that have been newly resolved by speckle interferometry. The most profitable goal for speckle observers is the direct resolution of spectroscopic binaries, and many of the sixty or so speckle binaries are, or could become, spectroscopic systems. Unfortunately, I am frequently quite frustrated by finding a very old, or very marginal, spectroscopic orbit for systems showing rapid motion. For example, one such system is the Hyades spectroscopic binary 51 Tauri, with a marginally determined spectroscopic period of 11 years. The object consists of an A8V primary and a G0 secondary with the sharper lines of the fainter component used for velocity determinations, so it is a challenge to spectroscopists, but its relevance to the Hyades problem should give it some priority. There are many cases of systems with evolved components and other astrophysically interesting characteristics, and I would urge spectroscopists to concentrate on them.

WORLEY: Several years ago McAlister reported that Beta Cyg A was a close binary. I have been able to measure this object on seven nights, and my results are in excellent agreement with his. However, there exists a third (speckle) observation of this object which is in complete disagreement. In entering the speckle measures in the double star catalog, I have noted a number of such discrepancies. These problems, I suspect, often arise because speckle cameras are moved rapidly about the world and attached to numerous telescopes, with each of which only a few measures are made. Evidently, there are calibration problems which are not adequately resolved, and I would urge that more attention be paid to this situation, since the credibility of speckle observations is at stake.

Secondly, I hope that speckle observers will settle on a list of common objects to observe, in order to control and evaluate their systematic errors.

EVANS: It seems to me that there is still a gap between various techniques. Only relatively long spectroscopic binaries can be resolved by speckle and other methods, and for these one can detect velocity variation if only one spectrum is visible, although what is really needed is to see both spectra. One needs shorter periods (100 days or less) and higher values of K to be resolved, but then, even for brighter stars, separations are below ten arc milliseconds. Mostly these objects have not been achieved (except of course for a few occultation observations), but if all these new techniques work, then a flood of new data on masses and parallaxes should become available.

ABT: If you need spectroscopic data, you can use either of two methods. As an analogy, you could get on the radio and broadcast to the whole world, hoping that the right people are listening, or you could get on the telephone, and locate the right people directly.

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BATTEN: I have some long-period binaries under observation and am willing to add to my list. The prospects for improving many of these orbits are good.

POPPER: One may ask whether, for systems resolved by interferometry, radial velocity observations on the one hand or parallax observations on the other are more likely to produce the information for completing the analysis for orbital and stellar properties. In the case of a system such as 51 Tau, for which the speckle orbit will apparently be forthcoming, I would bet on parallax as the likely winner. Parallax is the key to rescuing many important systems.

Several references have been made to increasing the supply of binaries that can give points on the mass/luminosity relation. The mass/luminosity relation, to be sure, is fundamental in the comparison of stellar models with actual stars. But other relations, such as mass/radius, are more useful in examining the evolutionary status of a star. Perhaps we should be refering to binary systems as providing fundamental stellar properties in the general sense rather than points on the mass/luminosity relation in particular.

SCARFE: Some long-period spectroscopic binaries contain giants, but no secondary detectable spectroscopically. The periods are long enough for them to be at least worth an attempt at interferometric resolution, but neither interferometry nor spectroscopy will yield a mass-ratio. However, the large magnitude difference is an asset to astrometrists, and a combination of astrometry and interferometry could thus yield a mass-ratio, with a parallax obtainable from the spectroscopic data. I would like to ask whether such systems would yield astrometrically measurable orbital motion.

LIPPINCOTT: They usually are too small.

FREDRICK: Don't forget the dull systems of long period. For example, VV Cephei. Pick your passband right, and you should resolve it. Its period is about 21 years, so maybe it is uninteresting, but the spectroscopic and the astrometric material still disagree.

HEINTZ: The techniques discussed today provide data of higher resolution and higher accuracy than were available previously. As the laborious reductions will be expedited, and, perhaps, the access to larger telescopes increased, we may expect a growing data output. Yet already now, a few isolated speckle positions or occultation vectors are high-weight data points to be taken into account.

In this way, the still "underprivileged" gap between visual and spectroscopic ranges of binary periods is being bridged, and actually the positional data penetrate deeply into the traditional spectroscopic territory. Owing to the combination of data thus available, this range may become the source of many good masses, because the usual major uncertainty, viz. that of parallax, can be bypassed. In particular, one can expect more studies of objects of special interest, such as abnormal spectra or colors, subsystems, high-velocity stars, etc.

High-quality work on orbits and masses will increasingly rely on data from different provenance. This fact underscores some responsibilities. For the data user, to ascertain that the database is comprehensive. For the producer, to have data recorded according to standard formats and in an umambiguous fashion, so that the transcribing labor and the risk of mistakes at the data centers is minimized.