Comparison of optical and radio positions of stars

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ABSTRACT. The positions of radio stars measured with respect to the VLBI network of extragalactic sources provides an important link between the optical and extragalactic reference frames. The establishment of this link was brought a stage nearer realization with the publication by Florkowski *et al.*(1985) of the radio positions of 20 stars measured with the Very Large Array (VLA) of the National Radio Astronomy Observatory, and the publication by Lestrade *et al.*(1985, 1988) of 10 stars measured with the VLBI network.

Several of these radio stars are known to be double, so it is necessary to check whether the optical and radio emission come from the same position in the system before these sources can be used as standard links between the reference frames.

The accuracy of the radio positions is typically $0''.03$, which is more accurate than the best optical positions available from catalogues at the present epoch. Even the FK5 has only an accuracy of about $0''.04$ at the epoch 1990; so astrometrists have started observational programmes to measure the positions of the radio stars.

Here we report on the optical positions obtained in the past few years with the automated meridian circle at Bordeaux in France (BORD) and the Carlsberg Automatic Meridian Circle (CAMC) at the Observatorio del Roque de los Muchachos, Instituto de Astrofísica de Canarias on the island of La Palma. The positions are referred to a homogeneous reference frame which is close to that of the FK5, covering the northern hemisphere and extending into the southern hemisphere as far as -45°. This improved optical reference frame gives the comparison with the radio reference frame advantages over previous work, such as Johnston *et al.*(1985), which was hampered by warping of the FK4 frame and the problem of extending even that inferior frame to fainter reference stars, especially in the southern hemisphere.

The new optical positions are intercompared with the radio ones and conclusions are drawn about the sizes of the offsets. The full text of this paper can be found in *Astron. Astrophys.* (1990).

J. H. Lieske and V. K. Abalakin (eds.), Inertial Coordinate System on the Sky, 513–514.

References

Florkowski, K.J., Johnston, K.J., Wade, C.M. & de Vegt, C.: (1985), *Astron. J.* **90**, 2381.

Johnston, K.J., de Vegt, C., Florkowski, D.R. & Wade, C.M.: (1985), *Astron. J.* **90**, 2390.

Lestrade, J.-F., Preston, R.A., Requième, Y., Rapaport, M. and Mutel, R.L.: (1985), in *HIPPARCOS, Scientific Aspects of the Input Catalogue Preparation*, 251, ESA SP-234.

Lestrade, J.-F., White, G.L., Jauncey, D.L. and Preston, R.A.: (1988), in *HIPPARCOS, Scientific Aspects of the Input Catalogue Preparation II*, 481, Comissió Interdepartamental de Recerca i Innovació Tecnològica, Generalitat de Catalunya.

Discussion

BATTEN: Since RS CVn is a known spectroscopic binary, I assume that when you speak of checking it for duplicity you refer to a possible visual (or interferometric) companion. I agree that any discrepancy in the radio and optical emissions of Algol is unlikely to be explained by associating the former with C—the radio emission is almost certainly associated with AB.

RÉQUIÈME: I agree.

HUGHES: It has been shown by de Vegt that some types of radio stars are not suitable for astrometric comparisons. There are differences between H_2O and SiO masers and active or "flare" stars. We should not lump all of these together simply as "radio stars."

YE: When making very precise comparisons between radio and optical positions of objects, do you think the radio positions may have small differences due to observations at different wave bands and that the radio position may not be the same counterpart in the optical region for the same celestial object?

RÉQUIÈME: We are looking for such small differences which are already evident for some radiostars like R Aqr and Alpha Sco A.