4th URSI AT-RASC, Gran Canaria, 19-24 May 2024

The Celestial Reference Frame at K-band (24 GHz) and future roadmap

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The K-band AstroGeo collaboration was launched in 2013 with the aim of building a K-band astrometric catalogue using VLBI astrometric and imaging observations of Active Galactic Nuclei (AGN) at 24 GHz, initiated in 2002 by Lanyi et al. [1] and Charlot et al. [2]. The efforts of the collaboration to increase the source density, sky coverage, and improve the astrometric accuracy of the K-band catalogue led to the adoption of the K-band astrometric catalogue in 2018 as part of the third realisation of the International Celestial Reference Frame, the ICRF3 (Charlot et al. [3]). Since its incorporation into ICRF3, the K-band Celestial Reference Frame has been significantly expanded. As of January 2024, the frame consists of 1315 relatively uniformly distributed sources - comparable to the number of regularly observed S/X-band sources - derived from 161 observing sessions and more than 2.57 million observations. For sources that overlap with the standard S/X-band frame, the median precision of the K-band frame is now comparable to that of the S/X-band frame. This development also highlights the growing potential of K-band geodesy. This contribution presents the forward-looking roadmap of the K-band collaboration aimed at continuously improving the observational quality and frame accuracy.

1. G. E. Lanyi et al., "The Celestial Reference Frame at 24 and 43 GHz. I. Astrometry," *Astrophysical Journal,* **139**, 5, May 2010, pp. 1695-1712, doi: 10.1088/0004-6256/139/5/1695.

2. P. Charlot et al., "The Celestial Reference Frame at 24 and 43 GHz. II. Imaging," *Astrophysical Journal,* **139**, 5, May 2010, pp. 1713-1770, doi: 10.1088/0004-6256/139/5/1713.

3. P. Charlot et al., "The third realization of the International Celestial Reference Frame by very long baseline interferometry," *Astronomy and Astrophysics Journal,* **644**, December 2020, pp. A159, doi: 10.1051/0004-6361/202038368.