

VERA status and results

H. Kobayashi^{1,2} and the VERA collaboration

¹Department of Astronomy, Graduate School of Science, The University of Tokyo,
7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan
email: hideyuki.kobayashi@nao.ac.jp

²National Astronomical Observatory of Japan, 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan

Abstract. VERA is a Very Long Baseline Interferometry (VLBI) array for astrometry, composed of four 20 m radio telescopes. They are located over a range of around 2300 km in Japan. VERA consists of a two-beam system equipped with 2, 6.7, 8, 22, and 43 GHz receivers. The two-beam system is used for phase referencing of the VLBI observations, to compensate for atmospheric-turbulence effects between two nearby objects. It has achieved measurements of annual parallaxes within 5 kpc with 10% accuracy. Observed sources are water, SiO, and methanol masers, which are found in molecular gas around star-forming regions and evolved stars. We have carried out a large program of astrometry to reveal the Galaxy's structure and velocity field. VERA has already measured trigonometric parallaxes of more than 30 sources and observed around a hundred sources using the two-beam astrometry technique. Maser sources are associated with high-mass star-forming regions, which are thought to trace the arm structure of the Galaxy. Using annual parallax and proper-motion measurements, their structure will be shown without kinematic distance assumptions. Some sources exhibit large differences between trigonometric-parallax measurements and kinematic distances. We present the status of the VERA project as well as recent results.

Keywords. masers, instrumentation: interferometers, techniques: interferometric, astrometry, Galaxy: structure
