43 GHz SiO masers in late-type stars with 86 GHz SiO masers in the Inner Galaxy

Loránt Sjouwerman
National Radio Astronomy Observatory (NRAO), PO.Box 0, Socorro NM 87801, U.S.A.
lsjouwerman@aoc.nrao.edu

Maria Messineo, Harm Habing
Sterrewacht, PO.Box 9513, 2300 RA Leiden, The Netherlands
messineo@strw.leidenuniv.nl, habing@strw.leidenuniv.nl

Abstract We present Very Large Array (VLA) observations of 43 GHz (J=1-0, v=2 and v=1) SiO maser emission in a sub-sample of late-type stars with relatively strong (> 0.5 Jy) 86 GHz SiO masers in the Inner Galaxy.

Keywords: Masers, Galactic center, AGB stars, Circumstellar matter, Astrometry

Messineo et al. (2002) report on a survey for 86 GHz masers in an IR-selected sample of late-type stars in the Inner Galaxy. Because the velocities of the circumstellar 86 GHz SiO masers indicate that they are located in the Inner Galaxy, their main objective is to use the detections both to study the intrinsic maser properties of the sample as well as to use the kinematic data – combined with that of other samples of stars, e.g. OH/IR stars – to study the dynamical structure of the Inner Galaxy.

Here, we selected a sample of relatively strong (> 0.5 Jy) 86 GHz (J=2-1, v=1) SiO masers within 2 degrees of Sgr A* in order to investigate the relative occurrence of the 86 and 43 GHz (J=1-0, v=2 and v=1) SiO maser lines. We observed 39, and detected 38 sources, mostly in both of the 43 GHz lines. In addition we found some non-targeted 43 GHz SiO masers. That the detection rate is so high, probably has to do both with the selection of the stronger 86 GHz SiO masers, and the time interval of roughly a year (about the expected stellar pulsation period of 300-400 days) between the 86 and 43 GHz observations.

The 43 GHz SiO masers can be used to measure stellar positions with VLBI, and thus proper motions over a time scale of years, e.g. with respect to the black hole Sgr A* (Sjouwerman et al. 1998). In particu-

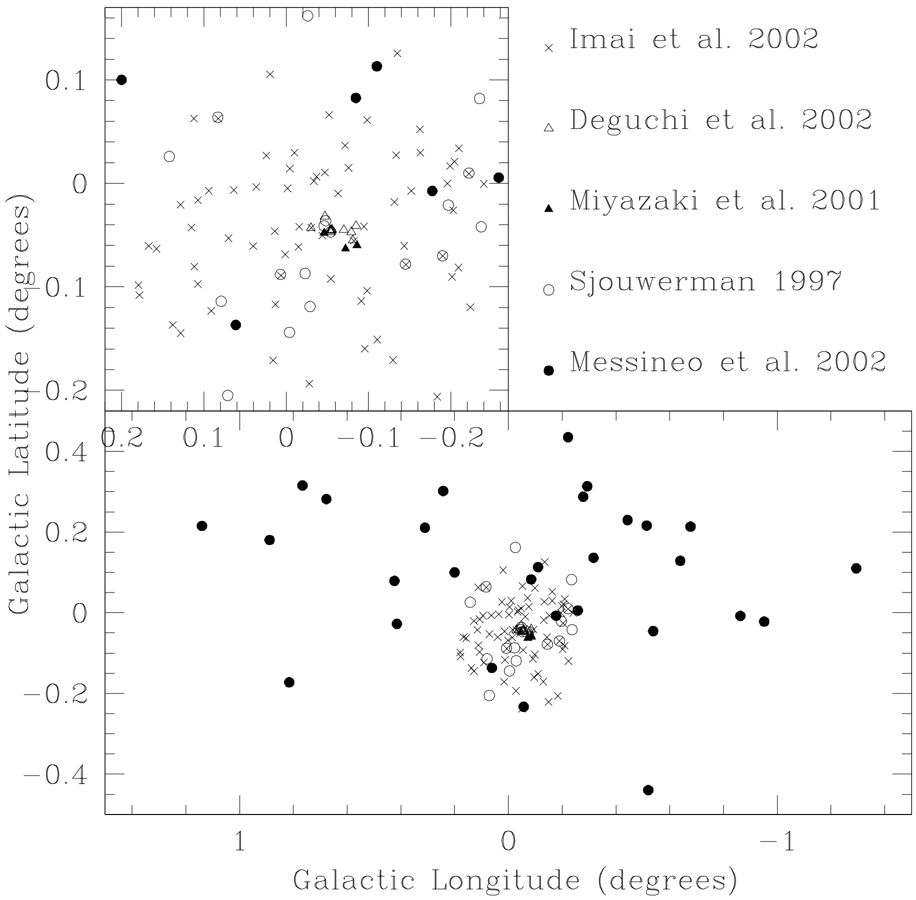

Figure 1. Current status of 43 GHz SiO masers in the Inner Galaxy.

lar, the Japanese VERA array is built for this purpose. However, the dual-beam VERA system is limited to a minimum separation between calibrator and target source of half a degree. The most interesting science are the stellar proper motions very close to the black hole Sgr A*. The 43 GHz detections presented here may serve as calibrators for such a program, now that numerous candidate 43 GHz masing stars have been found close to Sgr A* to measure the proper motions of (Figure 1).

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