

Observations of Possibly New OH Excited Rotational State Masers

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Abstract. In order to search for new 6.035 GHz excited OH masers 272 star-forming regions visible from the northern hemisphere with known active methanol masers were observed with the 32 m and 16 m radio telescopes of the Ventspils International Radio Astronomy Center (VIRAC). Three possibly new excited OH maser sources at 6.035 GHz were seen.

Keywords. star forming regions, methanol and excited OH masers

In order to search for new 6.035 GHz excited OH masers we selected 272 sources with declination $\delta > -7.5$ deg (to avoid problems with low observation elevations) from Torun methanol maser catalog and The 6-GHz Multibeam Maser Survey. The observation campaign took place during the years 2018 – 2022 in two phases. In the first phase, during the years 2018 – 2020, 78 objects were studied, and excited OH masers were searched for at frequencies of 6.035 GHz and 6.031 GHz. The results of this phase, were published in [Patoka *et al.* \(2021\)](#).

During the second phase remaining 194 objects were checked, search only for 6.035 GHz masers was performed with Ventspils 32 and 16 m (RT-32 and RT-16 respectively) radio telescopes in the observation setup with a total band width of 1.5625 MHz and a channel separation of 0.381 kHz or 0.019 km s^{-1} . The system temperature was 28 – 34 K and the typical observation time was about 4 hours and 3σ noise level 0.1 – 0.2 Jy. For details we refer the reader to [Patoka *et al.* \(2021\)](#); here we only highlight some preliminary results of our observation campaign, particularly our detections of three, to our knowledge, new excited OH maser sources.

During the observations in the years 2018 – 2021 methanol 6.035 GHz maser sources were checked. Thirty two already known objects were detected, a tentative signal (under 3σ) was detected from eighteen sources already known as excited OH masers, ten already known sources seem possibly variable. We also confirmed two new sources from [Szymczak *et al.* \(2020\)](#). More detailed results will be published later elsewhere. Three objects from our positive detections – G33.641–0228, G212.06–00.74 and G43.089–0.011, whose spectra are displayed in Figure 1 to 3, may be new excited OH masers.

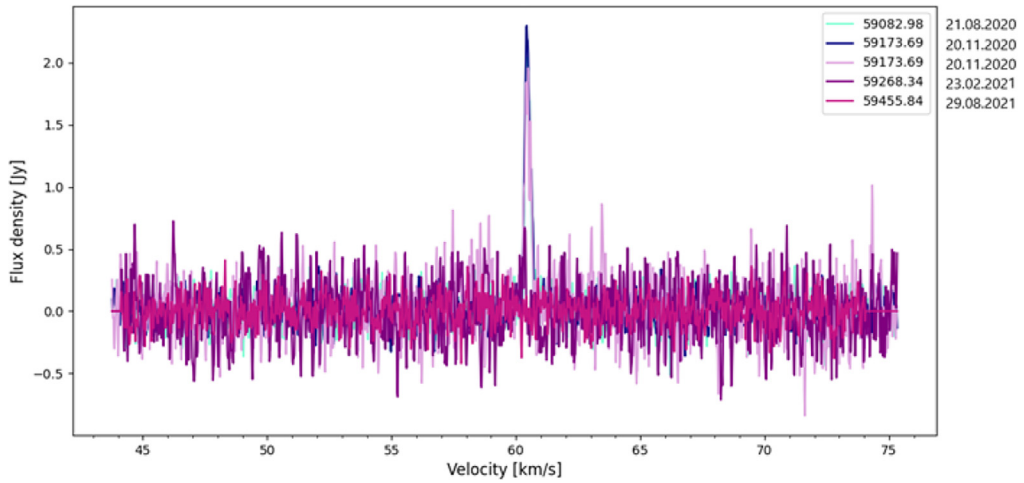


Figure 1. Spectra of 6.035 GHz excited OH maser emission toward G33.6410228. This maser was detected for the first time on 21.08.2020 with Irbene 32 m telescope (RT-32), thereafter with Irbene both telescopes RT-32 and RT-16. Five Gaussian components are displayed with fitted color lines.

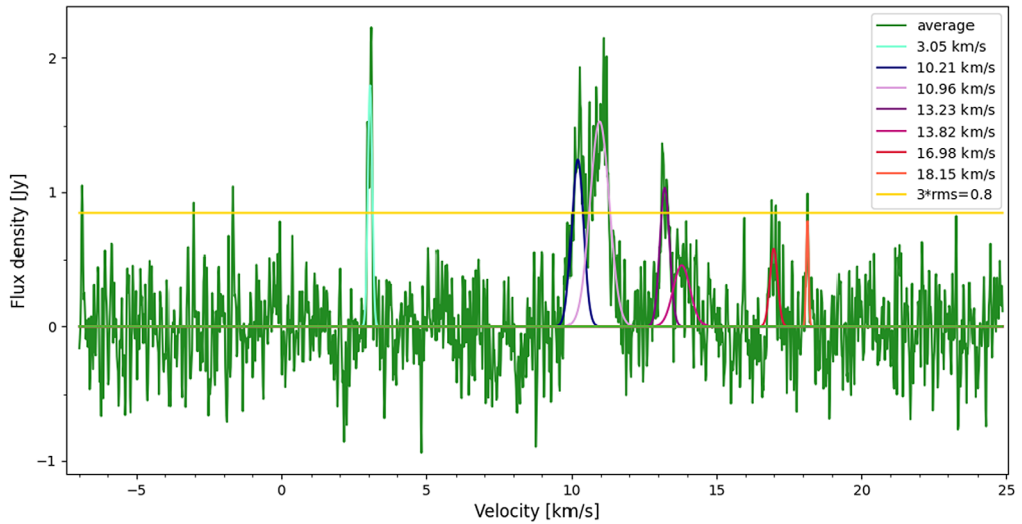


Figure 2. Same as Figure 1 but for G43.0890.011. This maser was detected for the first time on 11.07.2020 with RT32, thereafter 22.11.2020 with both telescopes. Seven Gaussian components are shown with fitted color lines.

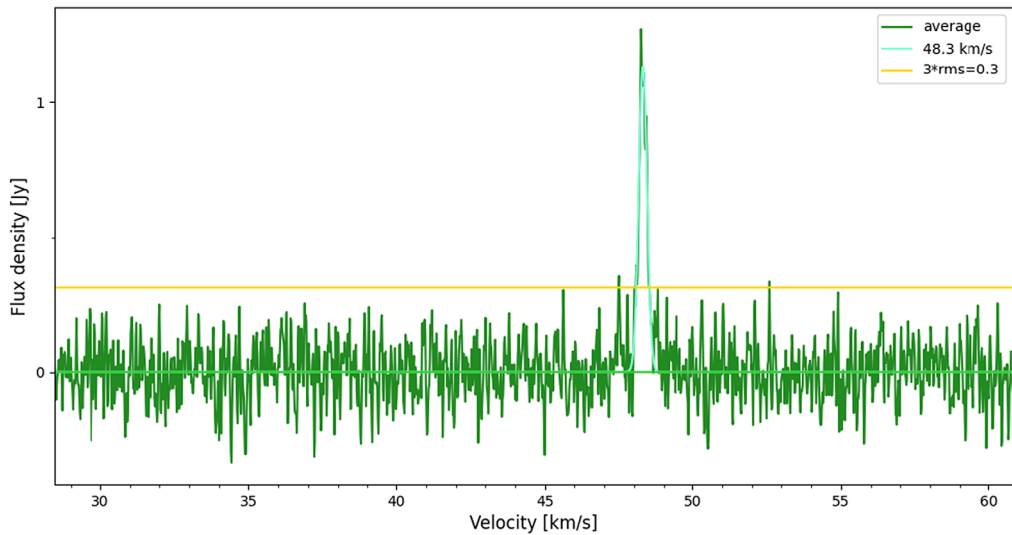


Figure 3. Same as Figure 1 but for G212.06-0074 detected with RT-32 28.03.2020.

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Supplementary material

To view supplementary material for this article, please visit <http://dx.doi.org/10.1017/S1743921323003125>

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