



A 95 GHz Class I Methanol Maser Survey Toward GLIMPSE Extended Green Objects (EGOs)

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We report the results of a systematic survey for 95 GHz class I methanol masers towards a new sample of 192 massive young stellar object (MYSO) candidates associated with ongoing outflows (known as extended green objects or EGOs) identified from the Spitzer GLIMPSE survey. The observations were made with the Australia Telescope National Facility (ATNF) Mopra 22-m radio telescope and resulted in the detection of 105 new 95 GHz class I methanol masers. For 92 of the sources our observations provide the first identification of a class I maser transition associated with these objects (i.e. they are new class I methanol maser sources). Our survey proves that there is indeed a high detection rate (55%) of class I methanol masers towards EGOs. Comparison of the GLIMPSE point sources associated with EGOs with and without class I methanol maser detections shows they have similar mid-IR colors, with the majority meeting the color selection criteria $-0.6 < [5.8] - [8.0] < 1.4$ and $0.5 < [3.6] - [4.5] < 4.0$. Investigations of the IRAC and MIPS 24 μ m colors and the associated millimeter dust clump properties (mass and density) of the EGOs for the sub-samples based on which class of methanol masers they are associated with suggests that the stellar mass range associated with class I methanol masers extends to lower masses than for class II methanol masers, or alternatively class I methanol masers may be associated with more than one evolutionary phase during the formation of a high-mass star.

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