

P45a **SMA Survey of the (Very) Low Luminosity Objects in Perseus**

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Very Low Luminosity Objects (VeLLOs, with the internal luminosity less than $0.1 L_{\odot}$) are the mysterious objects discovered by Spitzer Space Telescope. Because of the very low luminosity, the origin of VeLLOs is considered to be either (1) extremely young protostars (hereafter we call Type 1 VeLLO), or (2) very low mass objects (Type 2 VeLLO). The earlier studies showed a wide variety of the VeLLO properties such as outflow (outflow momentum flux of $1.5 \times 10^{-5} M_{\odot} \text{km s}^{-1} \text{yr}^{-1}$ for IRAM 04191, a Type 1 candidate, and $5.0 \times 10^{-8} M_{\odot} \text{km s}^{-1} \text{yr}^{-1}$ for L1014 IRS, a Type 2 candidate) and continuum emission (29 mJy at IRAM 04191 and 7 mJy at L1014 IRS), and this is probably due to the mixing of the two types.

In order to understand the origin of VeLLOs and classify them into the two types in a systematic way, we carried out a survey observation of compact 230 GHz continuum emissions and CO (2 – 1) outflows toward 8 low luminosity objects in Perseus with SMA. The targets are clearly separated into two types based on the continuum emission. 3 out of 8 sources are accompanied with a strong (> 30 mJy) continuum emission, whereas the continuum emission toward the other 5 sources are weak (< 10 mJy). Since this difference is also seen in the representative VeLLOs, the continuum flux would be a good index for the classification of VeLLOs. On the other hand, the CO outflow momentum is less correlated with the continuum flux and has a continuous distribution from 2.9×10^{-8} to $4.6 \times 10^{-6} M_{\odot} \text{km s}^{-1} \text{yr}^{-1}$.