Triggered Star Formation in a Turbulent ISM
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Sequential star formation in the Sh 254-258 molecular cloud: HHT maps of CO J=3-2 and 2-1 emission

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Abstract. The molecular cloud associated with the Sh 254-258 group of 5 small H II regions appears to be forming a (late)-OB association. We have mapped the associated molecular cloud in the J=2-1 line of the CO molecule over $0.75^o \times 1^o$, and the CO J=3-2 line toward the 2 main peaks, with the University of Arizona Heinrich Hertz Submm Telescope (HHT). We propose a scenario for sequential formation of the stars exciting the H II regions, triggered by the compression/heating of the molecular gas.

Keywords. ISM: clouds, ISM: molecules, submillimeter

The CO J=2-1 emission is shown as white contours in the left figure, overlaid on the 8 μm *MSX* image showing warm dust, and blue contours of VLA 20 cm continuum (Fich 1993 ApJS, 86, 475) showing the ionized gas. The main CO peak is directly between H II regions Sh 255 and 257. A second CO peak at top left is associated with warm dust but no ionized gas. The right figure shows the CO J=3-2 image ($10' \times 10'$, $24''$ resolution) centered on the main CO peak, with the H II region free-free emission (VLA 20 cm map) in white contours. The expanding H II regions appear to be compressing and heating the molecular gas, thereby initiating further star formation that is creating a small OB association. The CO images clearly show that the oldest H II region (Sh 254) has swept away or dissociated the molecular cloud on the right side of the ridge.

The second CO/mid-IR peak at top left is not obviously being affected by the visible H II regions. We suggest that it may be a compressed molecular core produced by colliding gas streams as seen in recent hydrodynamic simulations of cloud dynamics.

See website *mira.as.arizona.edu/∼jbieging/IAUSymp237/Sh254cloud.pdf*