

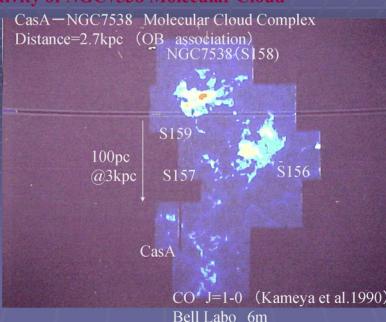
Star Formation in the NGC7538 Region

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Abstract

NGC7538 molecular cloud is one of active massive star forming regions in Perseus arm region. This region has at least three active regions (IRS1-3, IRS9, and IRS11) each of which consists of IR source, ultracompact HII region, CO outflow, high-dense gas core, H₂O maser, OH maser, methanol maser, etc. The details of each activity are described.

Activity of NGC7538 Molecular Cloud



Activity of NGC7538 Region

NGC7538 JHK image Ohja et al 2004



Fig. 1. JHK composite image of the NGC7538 star-forming region (J, H, K; L_{\star} = 100 pc) obtained with the three-color HST/STIS instrument mounted on the Hubble Space Telescope. The FWHM is $\sim 0.5 \times 0.5$ arcsec, and used to the left.

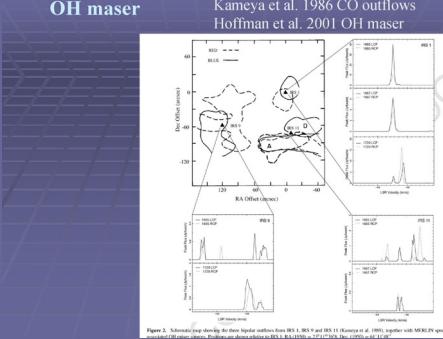
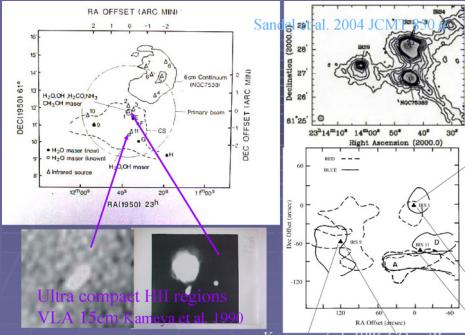


Figure 4. OH maser distribution and cross-correlation spectra for IRS1, IRS9, and IRS11. Features A, B, C, D are marked with circles and with MOLIN spectra of the cross-correlation function. The velocity range is -100 to $+100$ km/s.

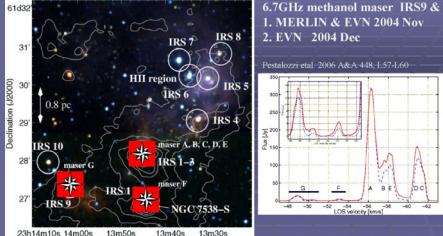


Figure 5. Cross correlated spectrum on the KN-DA baseline averaged over the whole observing run (dashed line) and autocorrelation spectrum from the DA antenna (solid line), both from run 1. Minimal fringe spacing is 1 mas. The baseline is -190 mas. Features A, B, C, D are located within 0.5 arcsec of IRS9. The inset is a zoom-in of the velocity region including features F & G. The multiplicity of F & G is discussed in the text.

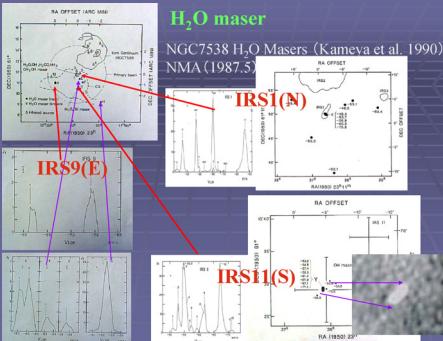
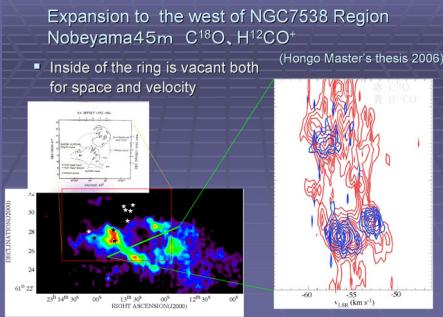
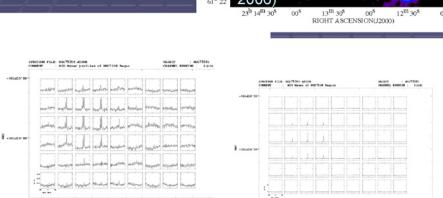


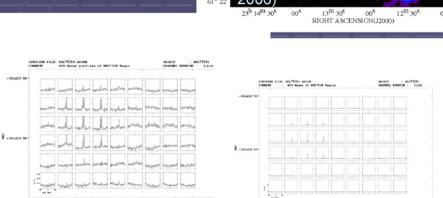
Figure 6. H₂O maser distribution at IRS1(N) and IRS11(S).



Expansion to the west of NGC7538 Region
Nobeyama 45m C¹⁸O, H¹²CO
(Hongo Master's thesis 2006)



VERA Mizusawa 20m
single-dish
observation of H₂O maser



VLBI observation of H₂O masers of NGC 7538

Observation date, time: 2005yr103d (April 14th)

4-15hJST

Stations: VERA 4 stations

Recording mode: GEO1D mode 16MHz-2bit-2ch

Recorder1000(256Mbps) (5 volumes)

Freq.: 22.235GHz (H₂O maser)

2 beam separation: ~2degree

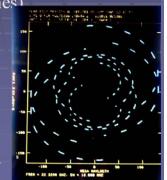
A beam: NGC7538S or N masers

B beam: Cepheus A masers

Calibrator: BL Lac, J2005+7752

Tsys: Miz:185-340K Irik:196-280K

Oga:350-700K Ishi:360-620K



Results of VERA Mapping of S (IRS11) 2005 105day

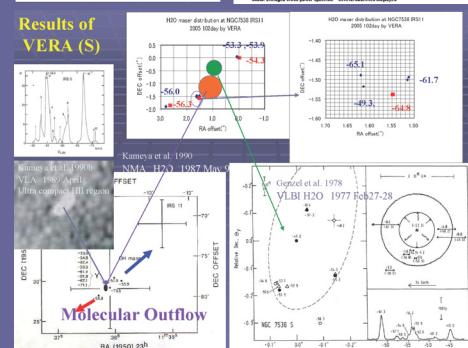
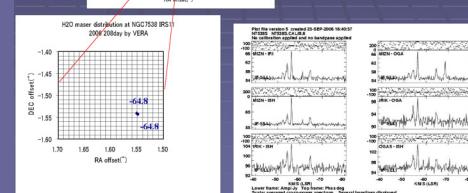
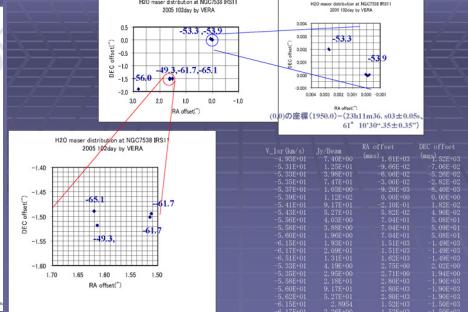


Figure 14. VLBI observations of IRS11 (S) in 2005 (left) and 2006 (right).

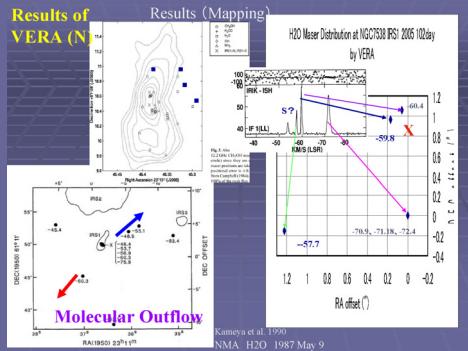


Figure 15. VLBI observations of IRS11 (N) in 2005 (left) and 2006 (right).

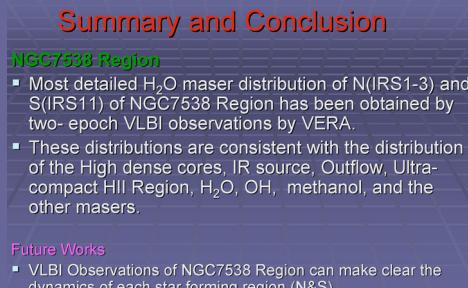


Figure 16. VLBI observations of IRS11 (N) in 2005 (left) and 2006 (right).

Figure 17. VLBI observations of IRS11 (S) in 2005 (left) and 2006 (right).

Figure 18. VLBI observations of IRS11 (S) in 2005 (left) and 2006 (right).

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