

Outflows from Young and Evolved Stars

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Outflows from Low-Mass Young Stars

SiO 8-7:

highly-collimated EHV jets

the jets consist of chains of knots

CO 3-2:

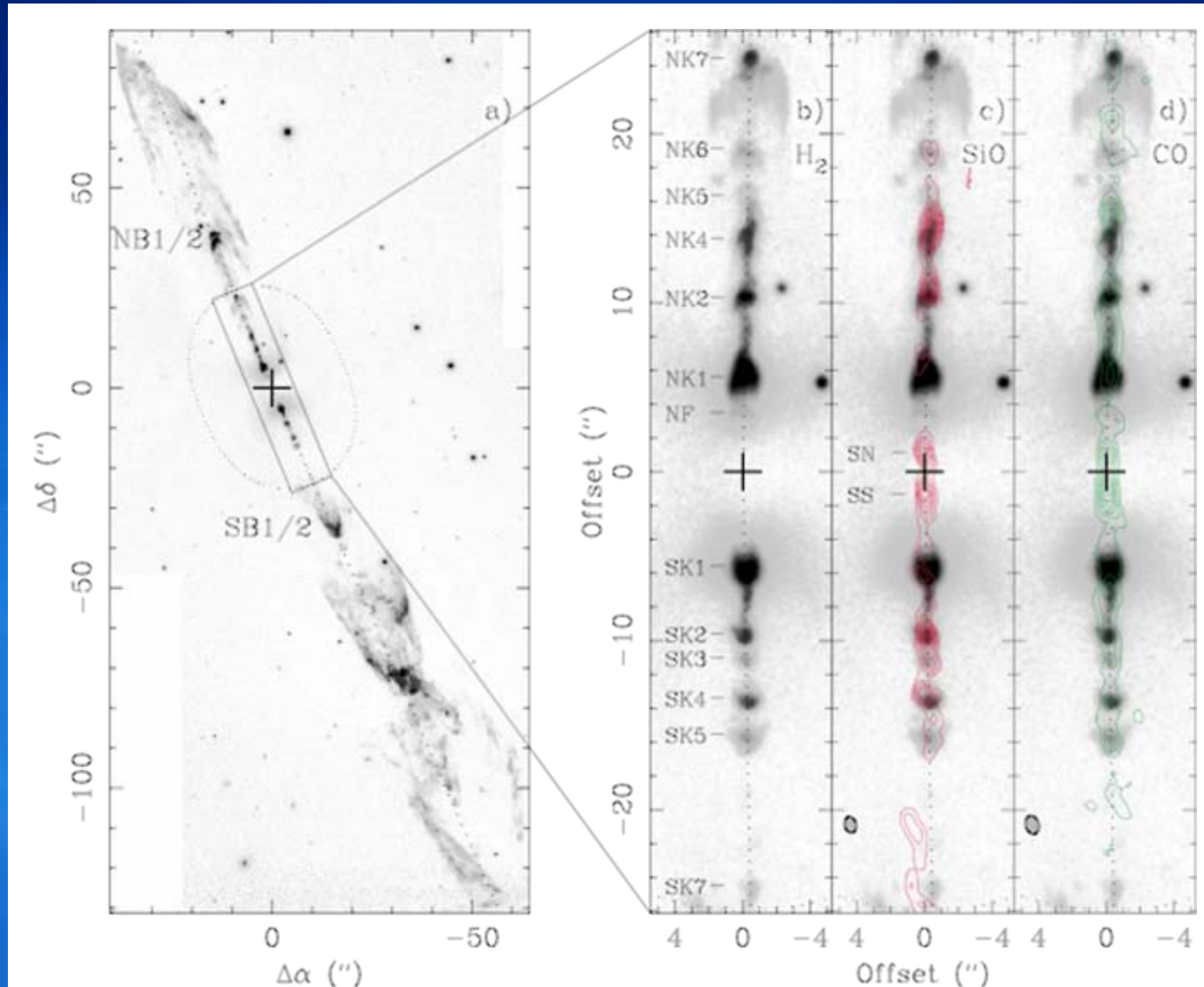
knotty jets in the high-velocity
low-velocity cavity

L1448-mm

HH211

HH212

HH212

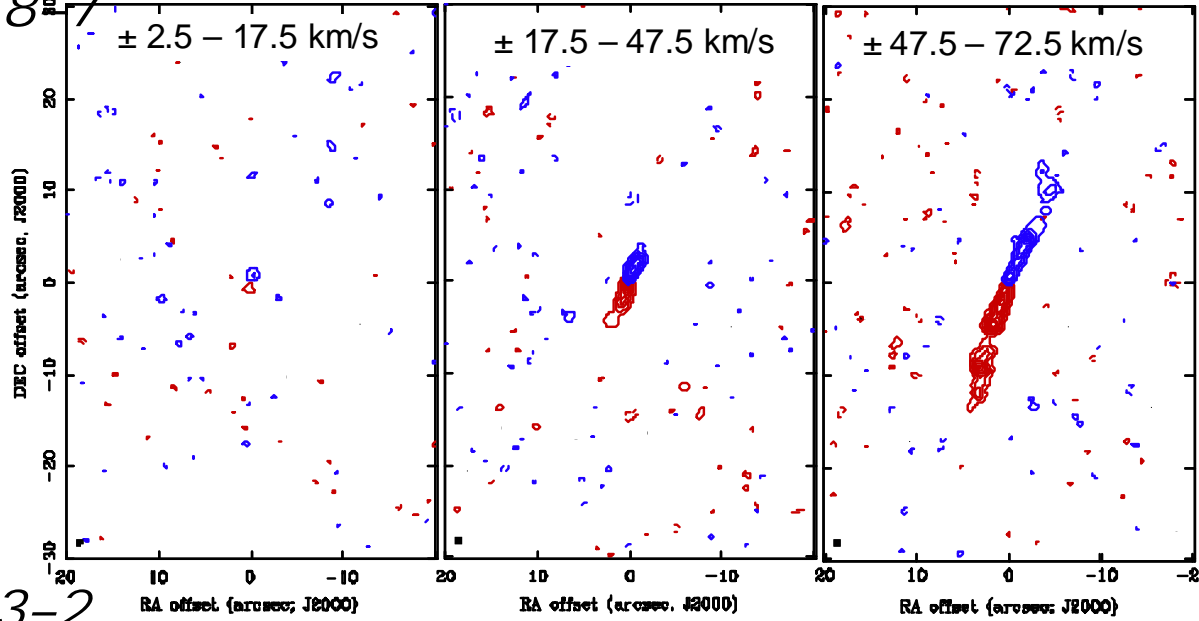


Beam size
1.16" x 0.84"

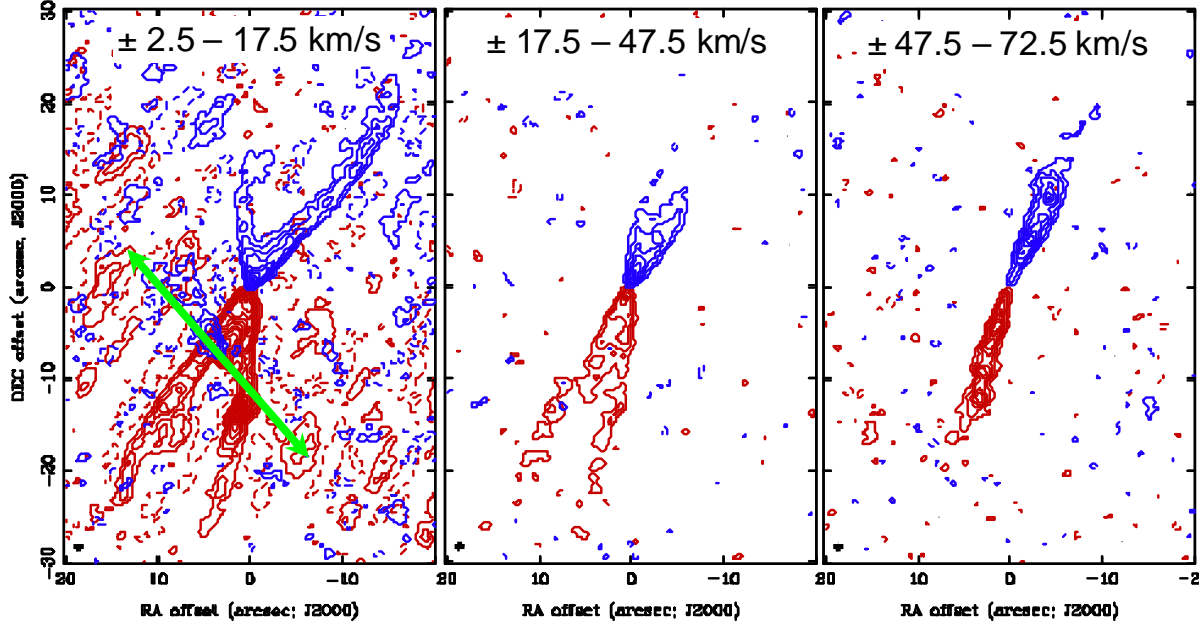
Lee et al. (2007) *ApJ*, 659, 499

L1448mm

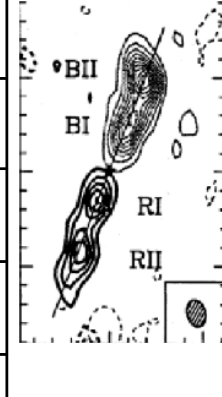
SiO 8-7



CO 3-2



SiO 2-1



Beam size
0.95" x 0.83"

Hirano et al. in prep.

H α & CO

[SII] & CO

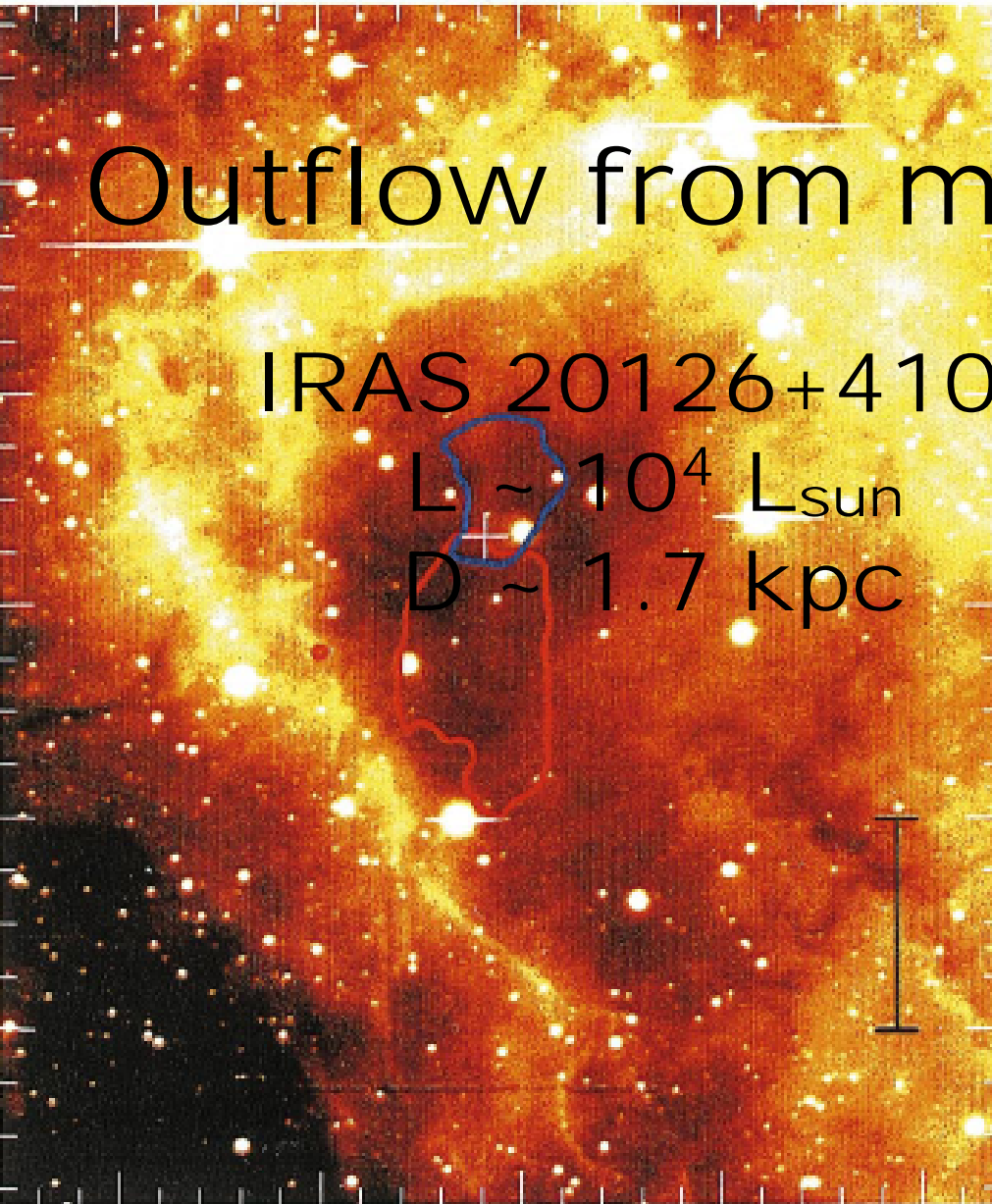
Outflow from massive young star

IRAS 20126+4104

$L \sim 10^4 L_{\text{sun}}$

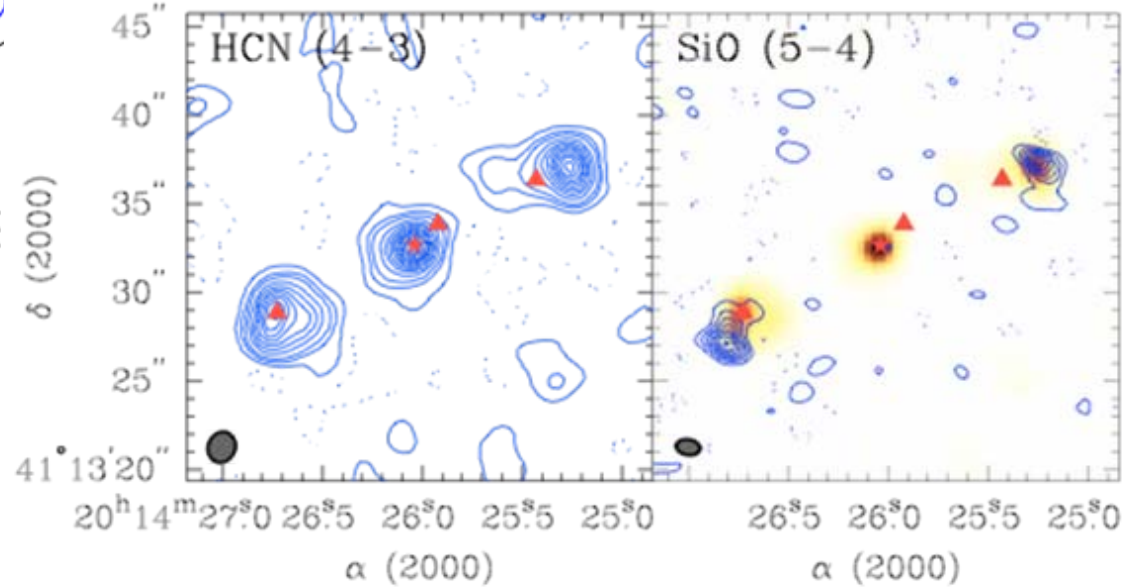
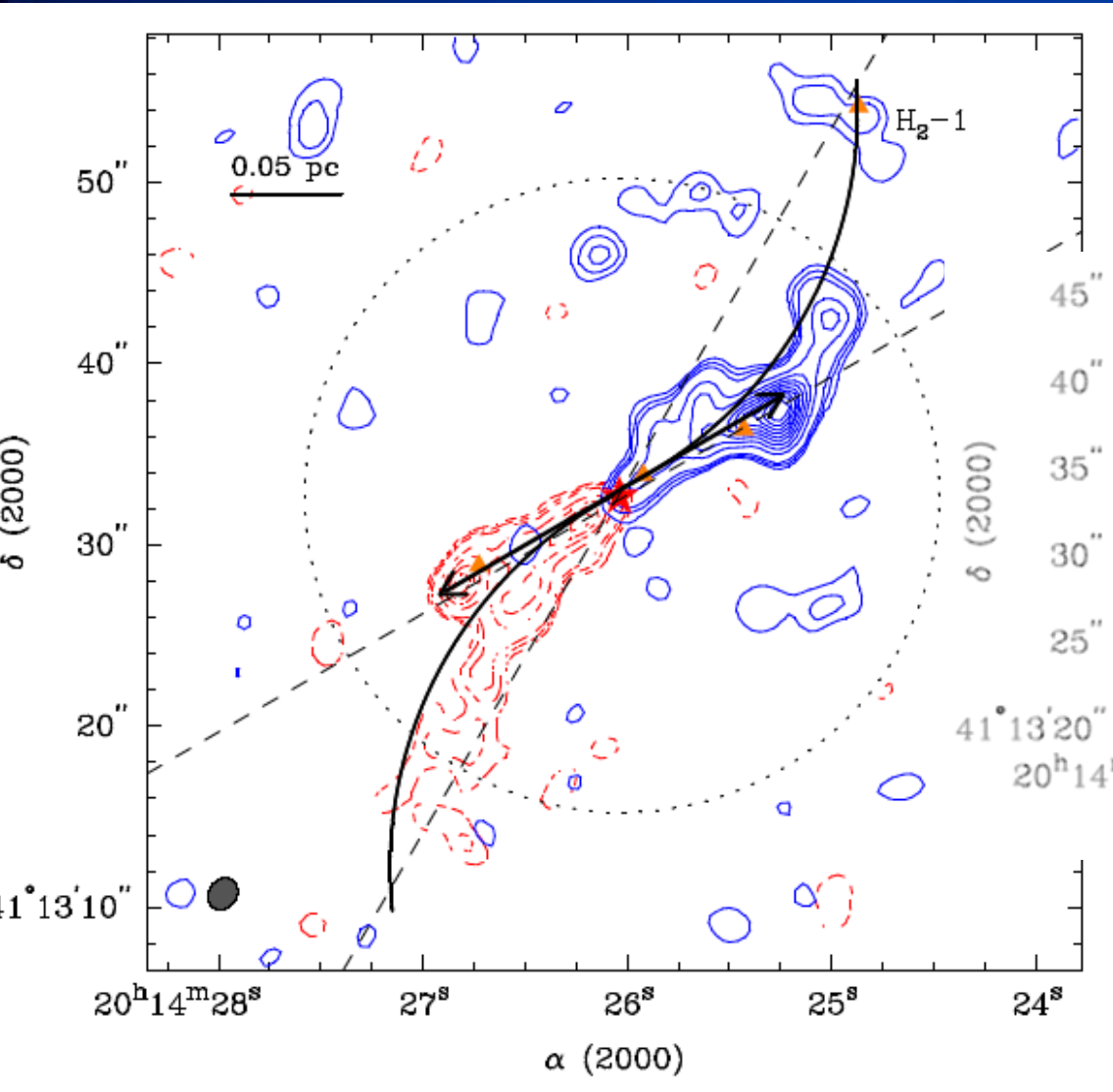
$D \sim 1.7 \text{ kpc}$

0.5 pc



CO 3-2 outflow

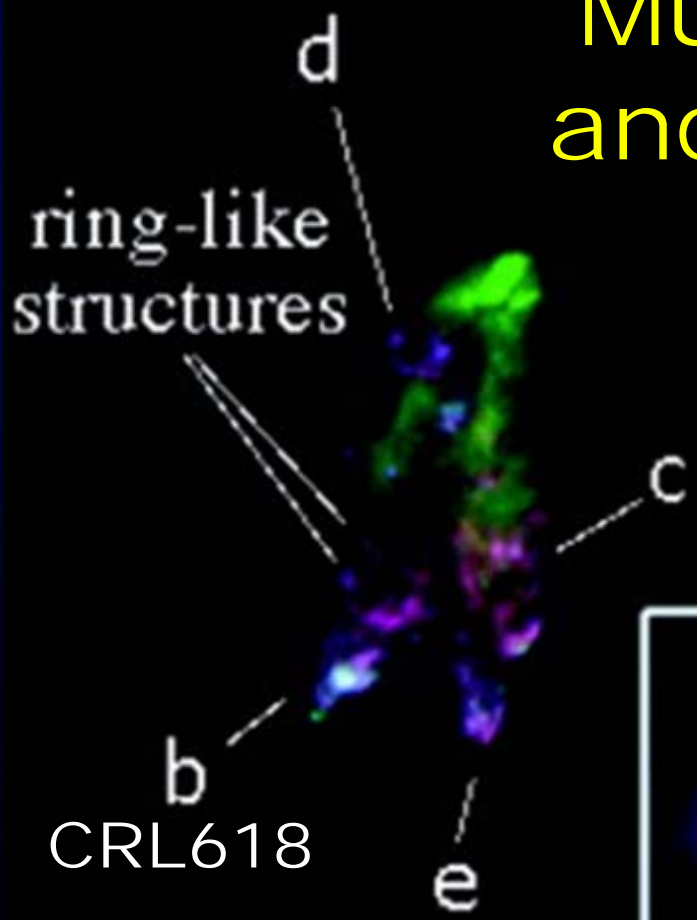
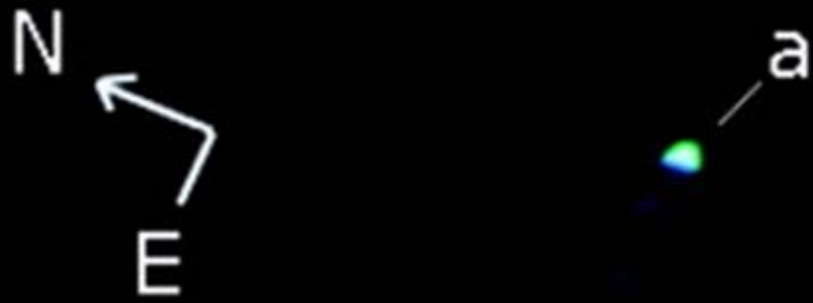
- S-shaped component (~ 0.4 pc)
- a collimated bipolar outflow (~ 0.2 pc)
- a compact high-velocity component (~ 4000 AU)



NGC7027

Outflows from evolved stars

Multipolar outflows and expanding torus

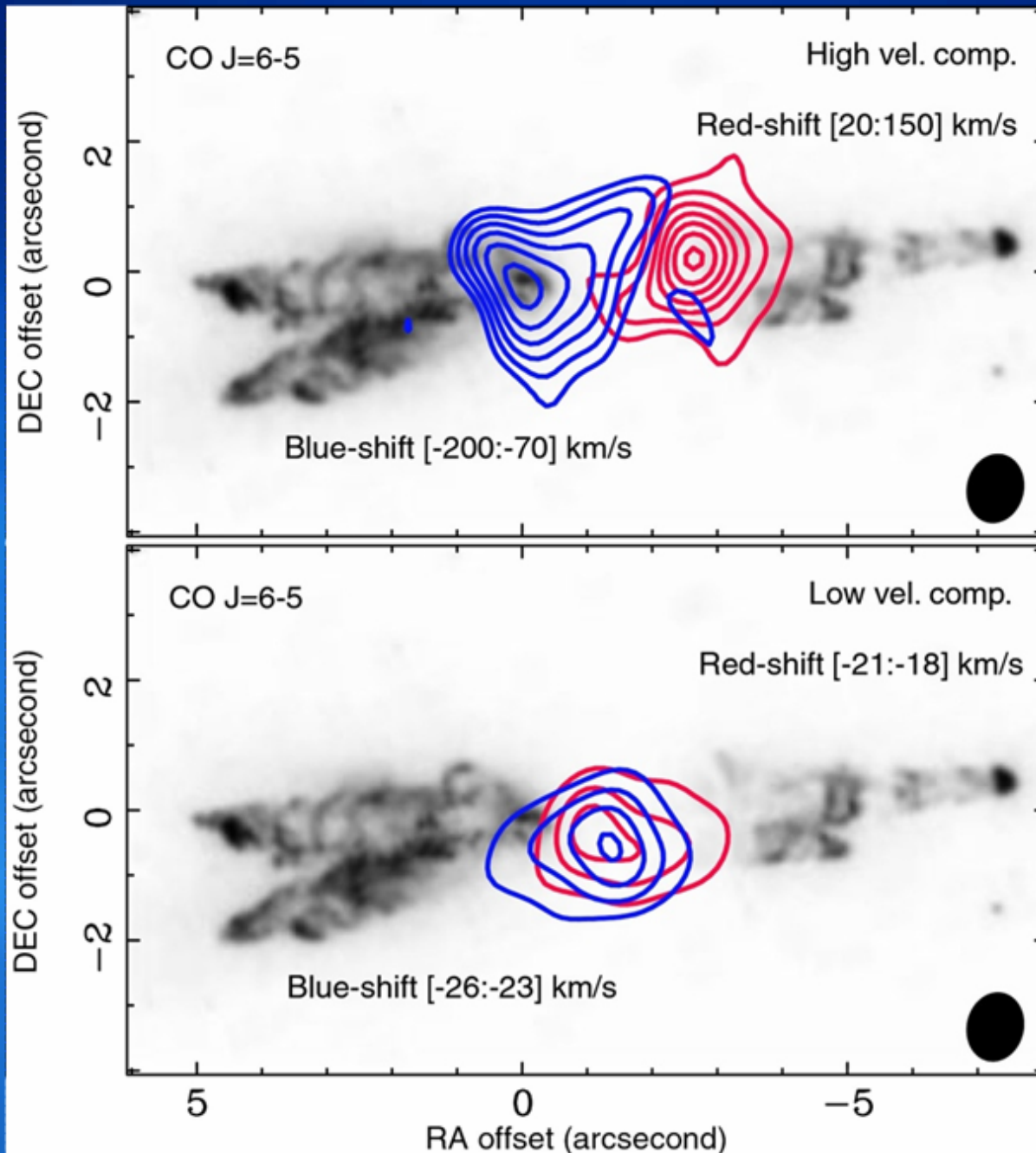


CRL618



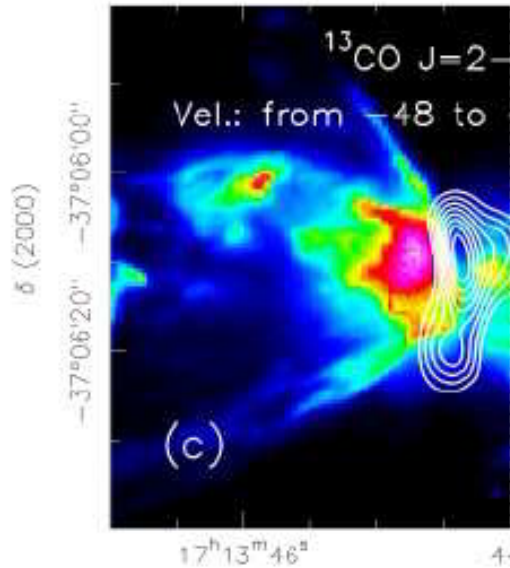
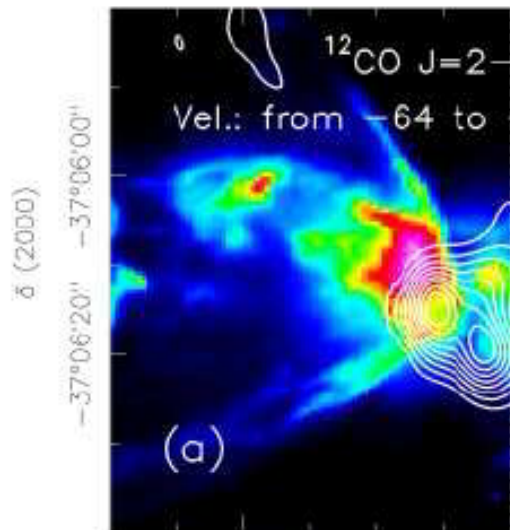
NGC6302

CO 6-5 from CRL 618

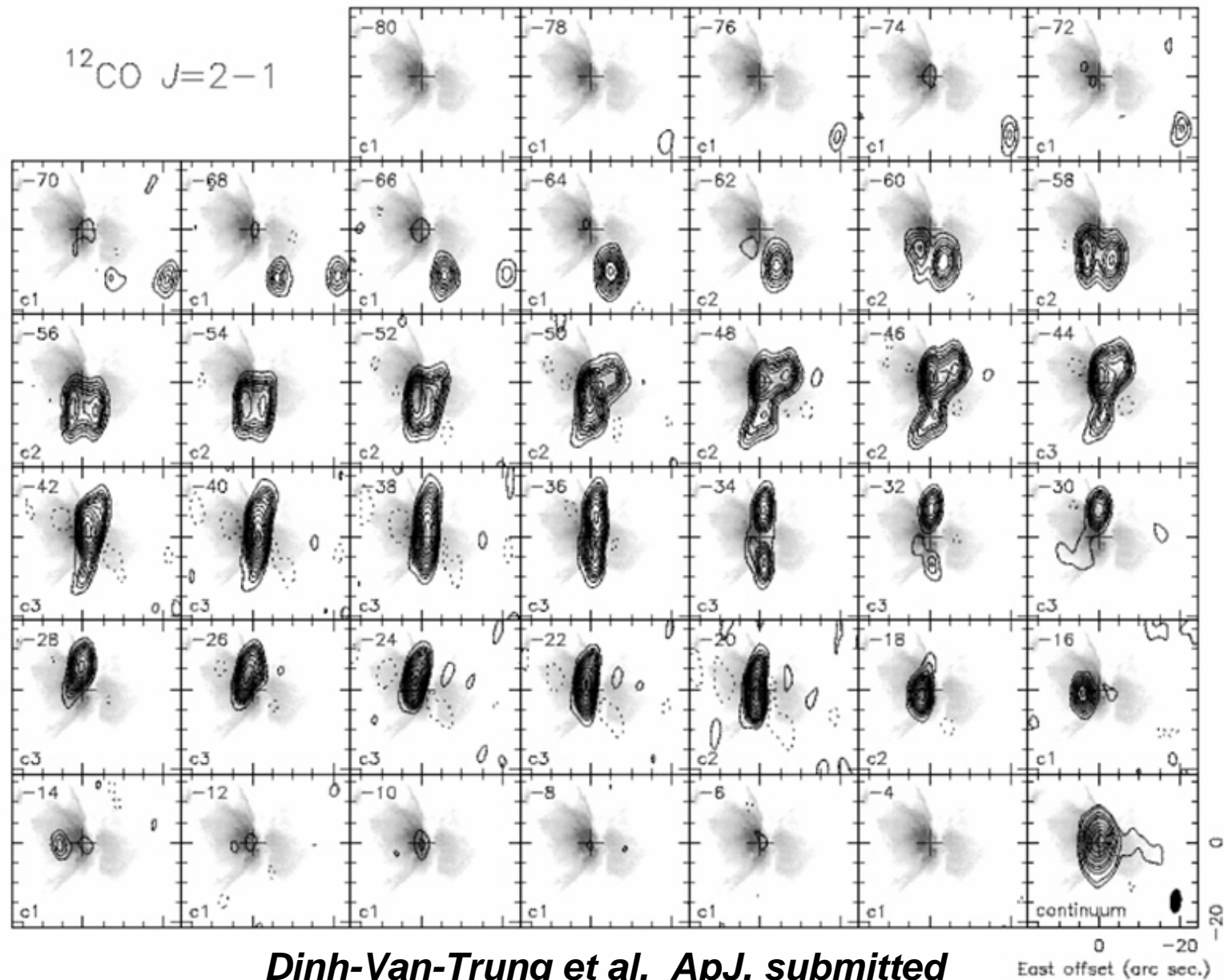


*Nakashima et al.
2007, AJ, in press*

Massive expanding torus & high velocity flow in NGC 6302



Peretto et al. 2007



Dinh-Van-Trung et al. *ApJ*, submitted

Discovery of two pairs of bipolar outflows in NGC 7027

