

Feedback of outflows in the Taurus Molecular Cloud

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Abstract. We collected 27 outflows from the literature and found 8 new ones in the FCRAO CO maps of the Taurus molecular cloud. The total kinetic energy of the 35 outflows is found to be about 3% of the gravitational potential energy from the whole cloud. The feedback effect due to the outflows is minor in Taurus.

Keywords. ISM: clouds — ISM: jets and outflows — ISM: individual (Taurus)

1. Data and Analysis

The 100-square-degree FCRAO CO maps of the Taurus molecular cloud provide an opportunity to study the feedback of outflows to the whole cloud. We collected 27 outflows from the literature and found 8 new ones in the maps. Most of the new outflows we find are of small spatial extent, i.e. less than 10'. They were overlooked in previous searches, likely due to their small size. We found them by searching around Young stellar objects (YSOs). The search is performed by an interactive pipeline in IDL developed by our team. Figure 1 shows an example of CO spectra (panel a), and the contour map around SST 043953.9+260309 (panel b). We calculated the total kinetic energy of the 35 outflows and compared it to the gravitational potential energy of the Taurus molecular cloud which is obtained by Goldsmith *et al.* (2008). The kinetic energy of the outflows amounts to about 3% of the gravitational potential energy, which means that the feedback of protostellar outflows has limited impact on the parent molecular cloud in Taurus.

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Reference

Goldsmith, P. F., Heyer, M., Narayanan, G., Snell, R., Li D., & Brunt C. 2008, *ApJ*, 680, 428

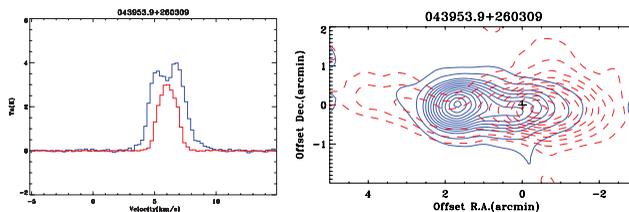


Figure 1. Properties of SST 043953.9+260309: (a) spectra of $^{12}\text{CO } J = 1 - 0$ (upper) and $^{13}\text{CO } J = 1 - 0$ (lower), (b) contour map of ^{12}CO red wing (solid) and blue wing (dash).