

P130a **Multiple Coherent Shell Structures Revealed by ALMA Observation of the HH 46/47 Molecular Outflow**

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During the star formation, the accretion disk drives fast MHD winds which usually contain two components, a collimated jet and a radially distributed wide-angle wind. These winds further entrain the ambient gas into a secondary outflow which is traced by molecules. We present ALMA cycle 3 observation of the HH 46/47 molecular outflow, in which we have identified multiple wide-angle outflowing shell structures in both blue and red-shifted outflow. These shells are highly coherent in the position-position-velocity space, extending to $\gtrsim 40 - 50 \text{ km s}^{-1}$ in velocity and 10^4 AU in space with well defined morphology and kinematics. With simple model fitting, we believe each of these outflowing shells is resultant from entrainment of ambient gas by an outburst event in the wide-angle wind. While episodic outbursts in collimated jet has been seen before, this is rare evidence that the wide-angle wind, same as the collimated jet, experiences episodicity, as expected by theories of episodic accretion and wind launching. The coherent shell structure further implies that the wide-angle wind should be launched from a relatively narrow region on the disk, which put constraints on the theory of wind launching.