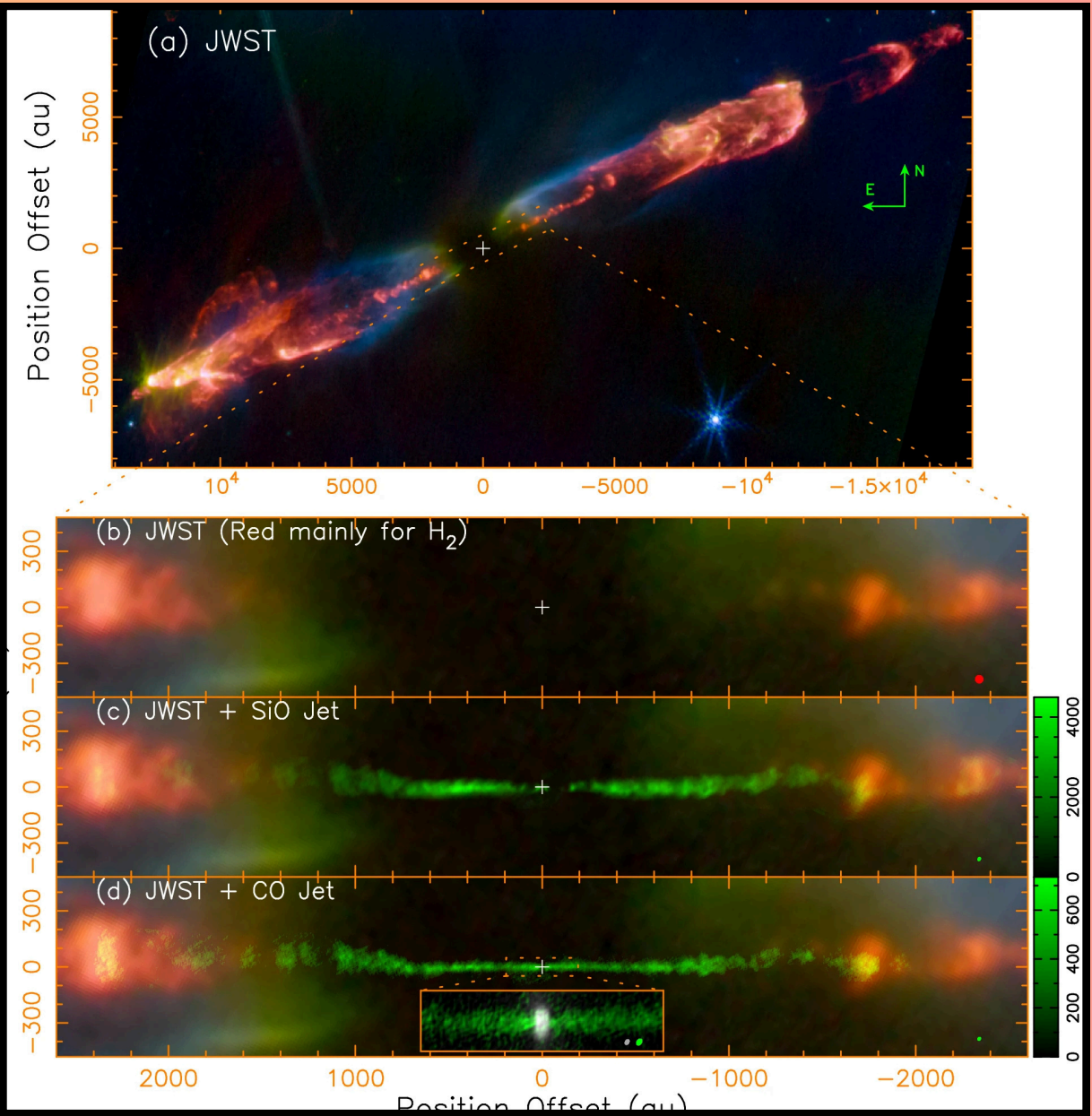


This is an average over the $3'' \times 3''$ field-of-view of the integral field unit shown in red in the inset image. The most prominent H2 0–0, 1–0 and 2–1 transitions are shown in blue, black and red, respectively, along with CO transitions in green. Note the presence of the secondary peaks accompanying the 12CO fundamental series (inset plot) due to the 13CO isotopologue. The spectral coverage of the NIRCams imaging filters is shown above the wavelength axis for reference.

NIRSPEC SPECTRUM OF THE APEX OF THE HH 211 SOUTHEAST BOW SHOCK. (RAY, T.P. ET AL.)

WST composite image and ALMA SiO and CO images of the HH 211 outflow. **(a)** The JWST composite image: blue for F335M (several H₂ lines and continuum nebulosity), green for F460M (4.69 μ m H₂ line, CO rotational-vibrational band head emission, and continuum nebulosity), and red for F470N (4.69 μ m H₂ line) filters. The cross marks the position of the protostar located at ICRS $\alpha_{(2000)} = 3^{\text{h}}43^{\text{m}}56^{\text{s}}.808$ and $\delta_{(2000)} = 32^{\circ}00'50''.1535$ ¹¹. **(b)** Zooms in to the inner region in the WST image. **(c)** The ALMA SiO image (green) with the JWST image. **(d)** The ALMA CO image (green) with the JWST image. The CO map is obtained with $v_{\text{rel}} \sim -30$ to -16 km s⁻¹ for the SE component and 19 to 32 km s⁻¹ for the NW component to avoid any significant contamination of the shells, where v_{rel} is the radial velocity relative to the systemic velocity of ~ 9.2 km s⁻¹. The insert shows the innermost part of the CO jet with the continuum map of the disk (gray image) reported before¹¹. The resolutions are ~ 10 au for SiO and CO in panels c and d, and ~ 7.5 au for CO in the insert.

JWST COMPOSITE IMAGE AND ALMA H2, SIO AND CO IMAGES OF THE HH 211 OUTFLOW. (CHIN-FEI LEE ET AL.)



Technique	Wavelength	What it Reveals	Typical Instruments
Emission-Line Imaging	Optical/NIR	Shock fronts, knots, morphology	Hubble, VLT, Subaru
Spectroscopy	Optical/NIR/mm	Velocity, ionization, chemical structure	Keck, ALMA, JWST, SMA
Radio Continuum Mapping	Radio, mm	Ionized jets, mass-loss rates	VLA, ALMA
Molecular Line Mapping	mm/Sub-mm	Outflow mass and extent	ALMA, IRAM, JCMT
Time-Lapse/Proper Motion	Optical	Jet velocity, variability	HST, Gemini

ABOVE TABLE SHOWS DIFFERENT SPECTROSCOPIC METHODS FOR STUDYING VARIOUS PROPERTIES OF STELLAR JETS