Outflows from Young Stellar Objects

MHD, Radiation & Chemistry

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Outline

Star formation : What do we know

Star formation : Feedback

Talk about winds and outflows

Present challenges

Outflow Evolutionary Picture

Chemistry in outflows

Molecular bullets and EHV emission

Numerical code

Launching and Propagation

Radiation force

Chemistry and Cooling

MHD Acceleration

Collimation and Radiation

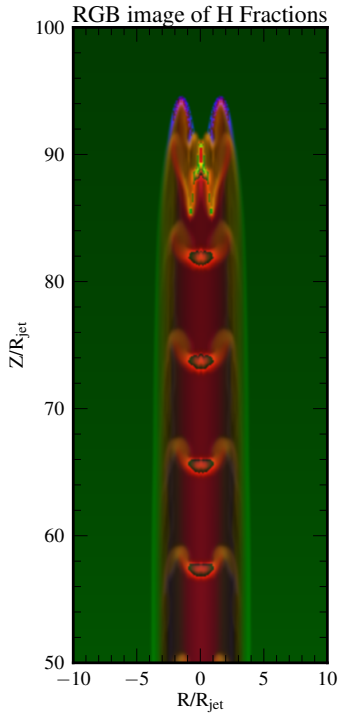
Force Parameters and its impact

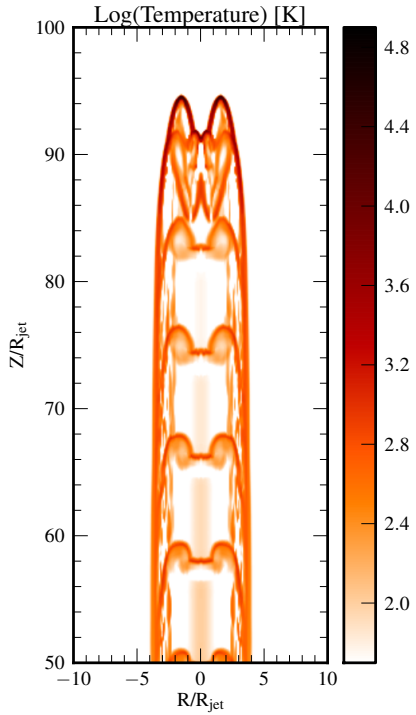
Resistive effects

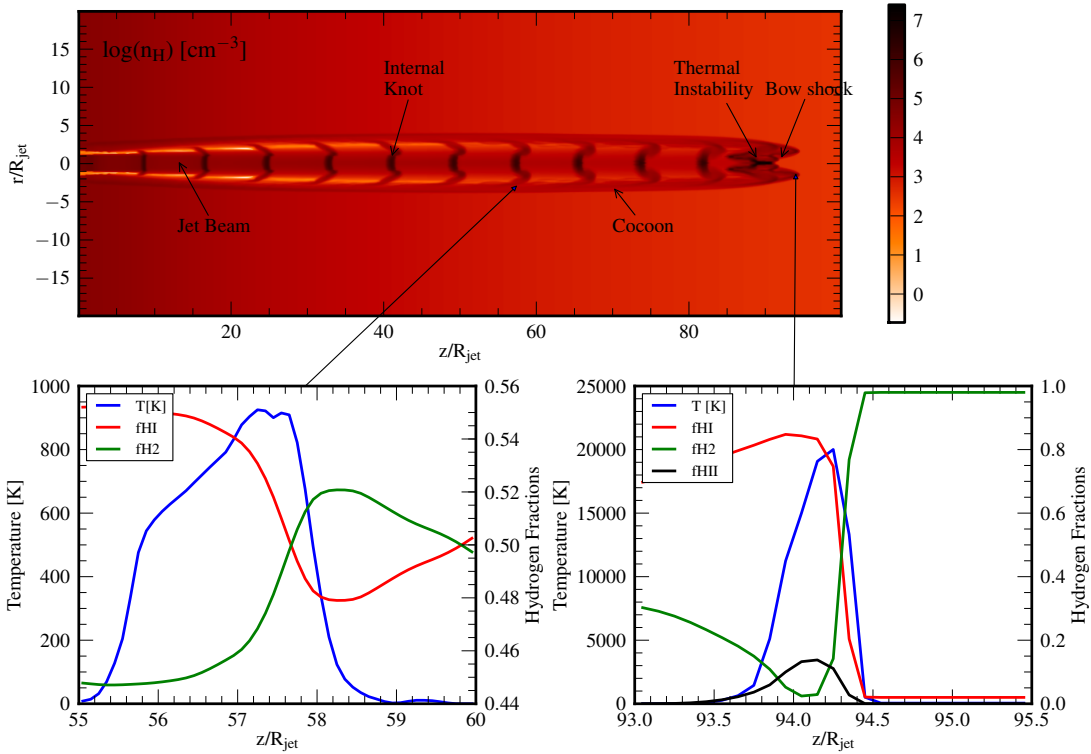
A case of Orion Source I

Cooling in Jets

Molecular Interplay

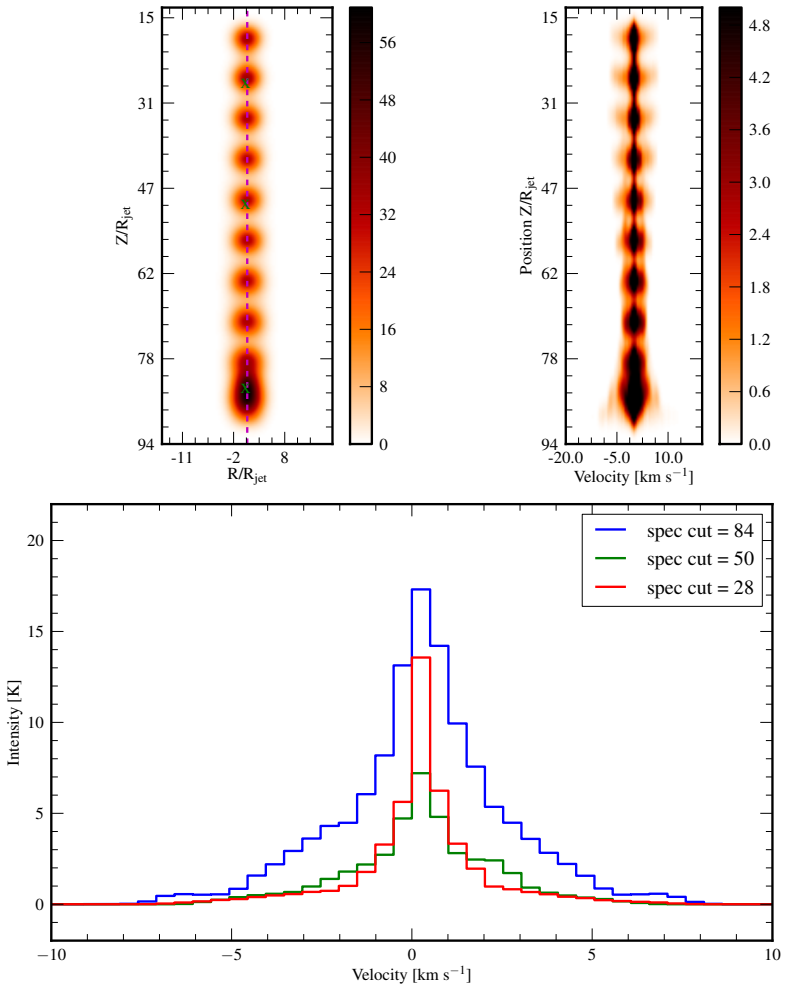




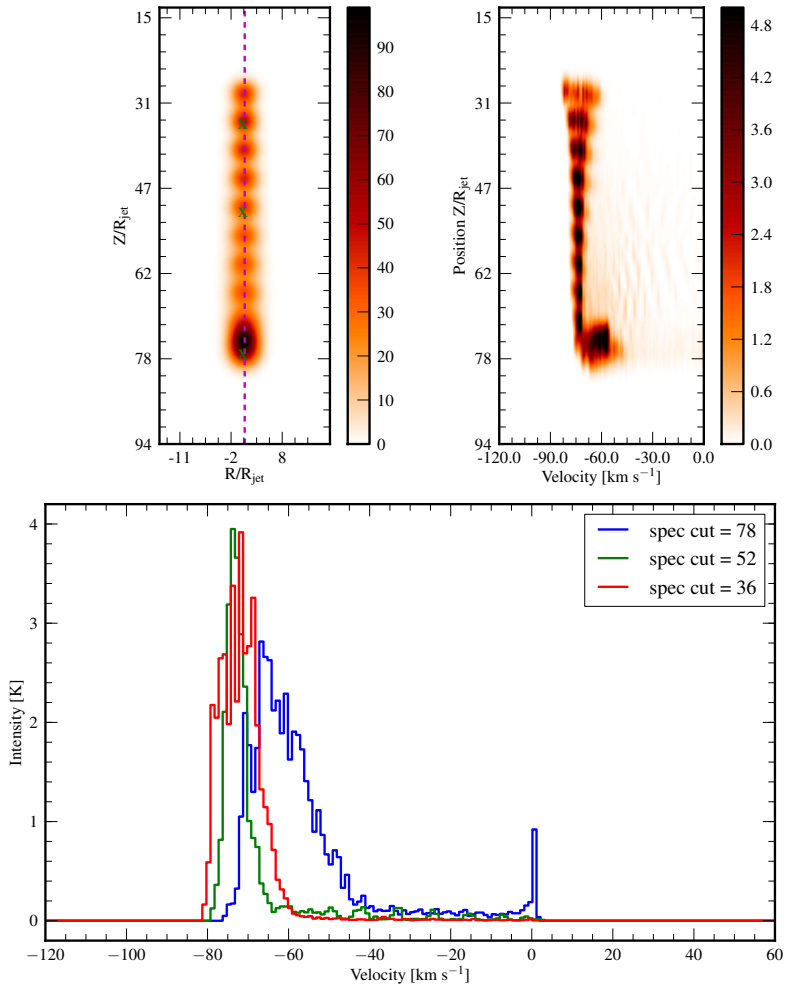


SiO Abundance and Jet Velocity

Spectra and PV diagrams : SiO (2-1)



$\phi = \pi/2$ (Plane of Sky)



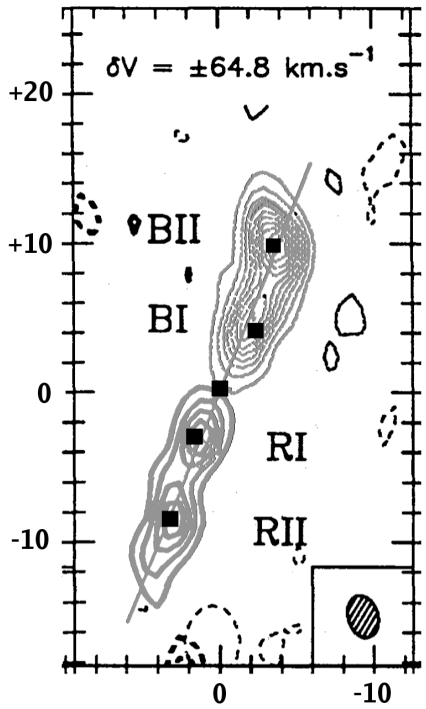
$\phi = \pi/4$

Multi-Line survey : Emission I

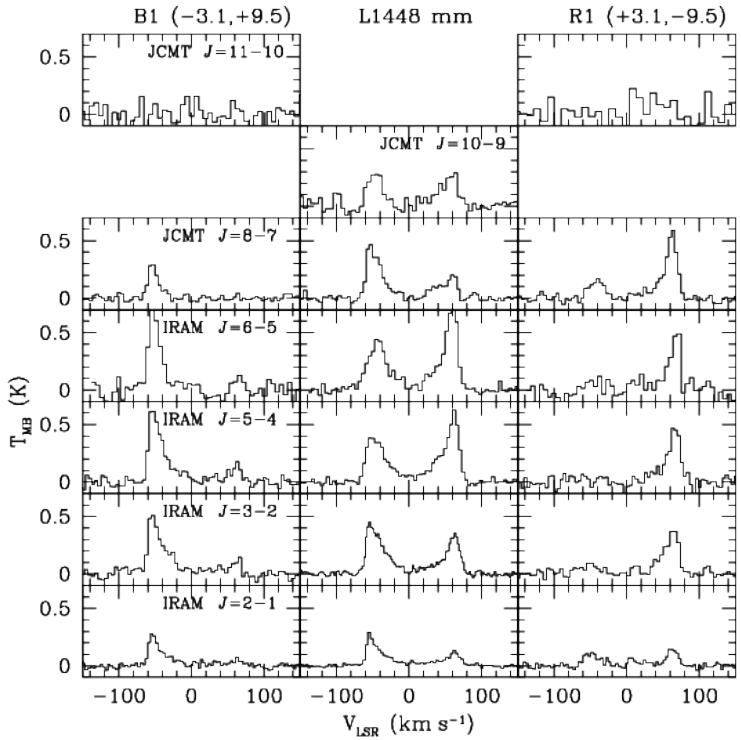
Movies Here.

Multi-Line survey : Emission II

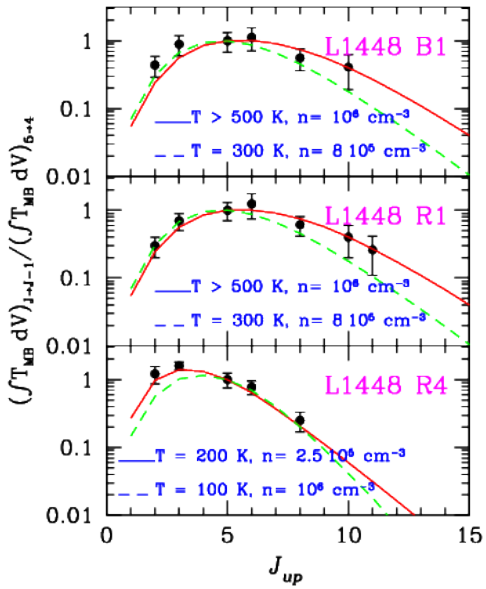
Case of L1448 (Nisini 2007)



Contours SiO 2-1



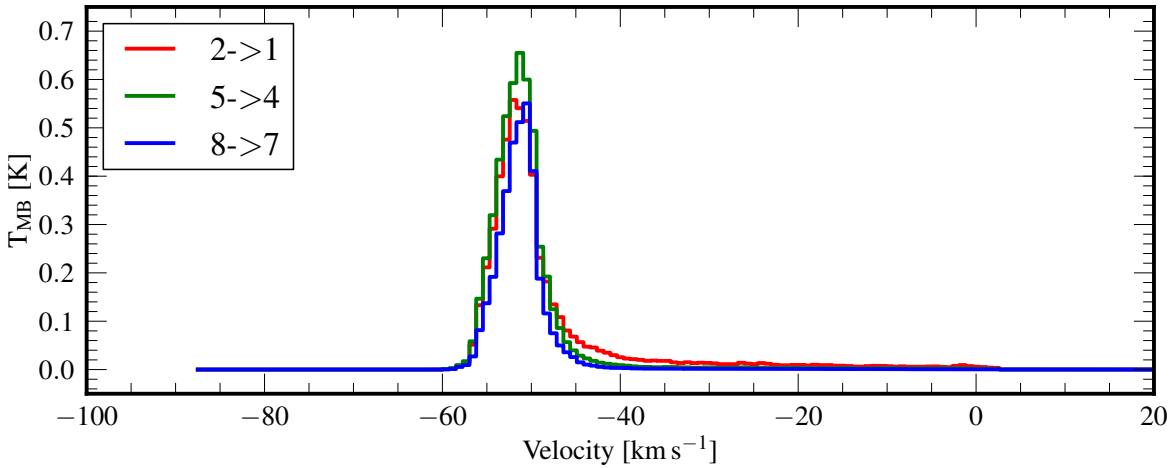
Spectral Features

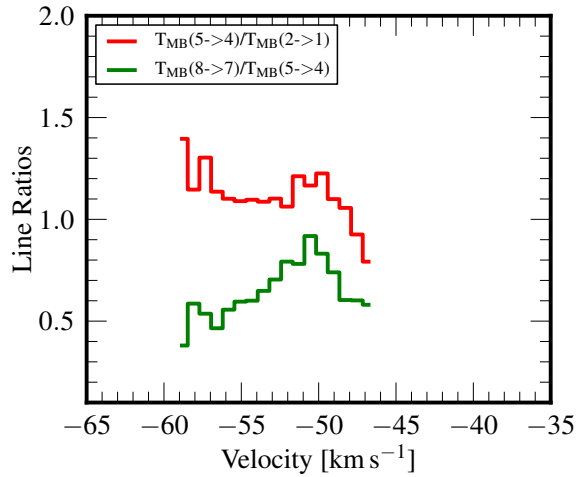


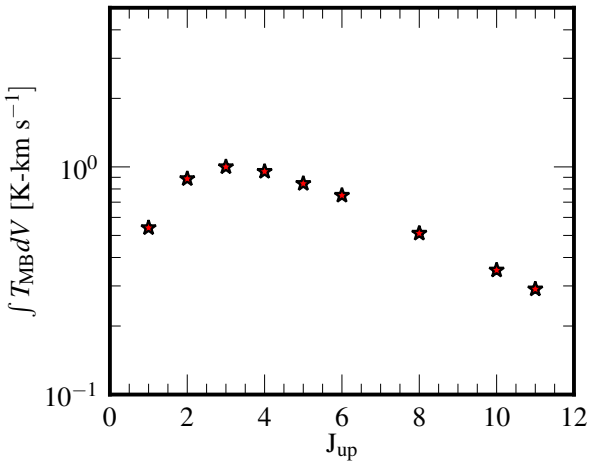
Kinematic Study (LVG)

Multi-line survey : Line Ratios

- EHV emission of 0.5 K.
- Line ratios close to Unity.
- Multi-line emission show a distinct fall at high J_{up}.

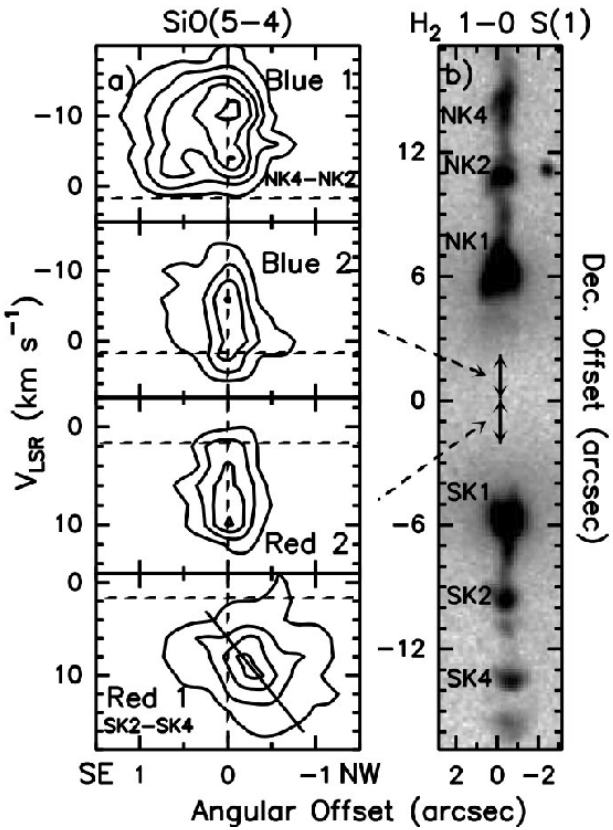




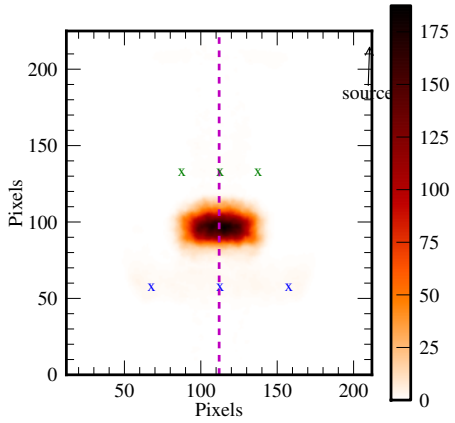


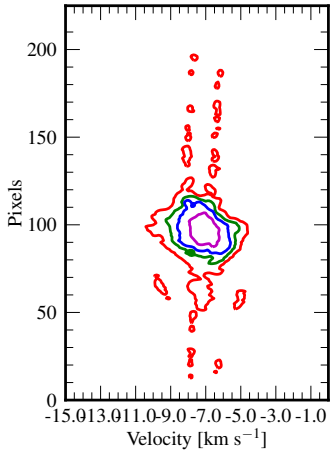
Predictions for ALMA

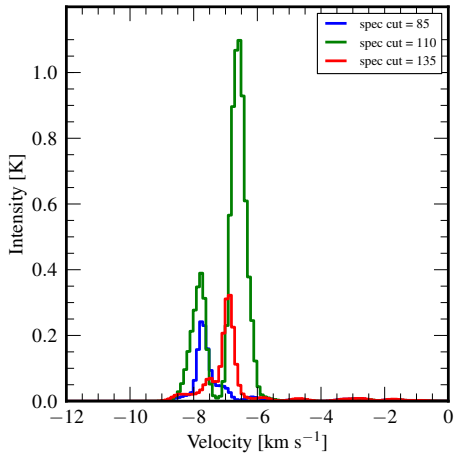
Focussing on a single knot

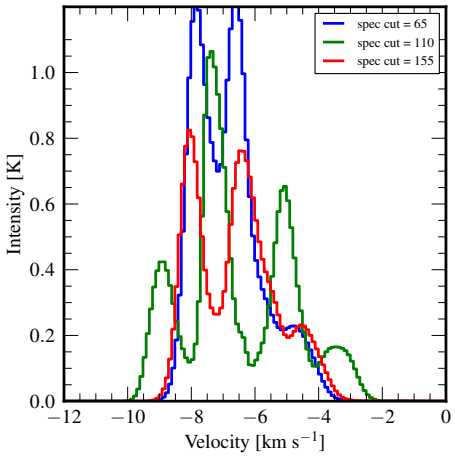


HH 212 (Codella 2007)

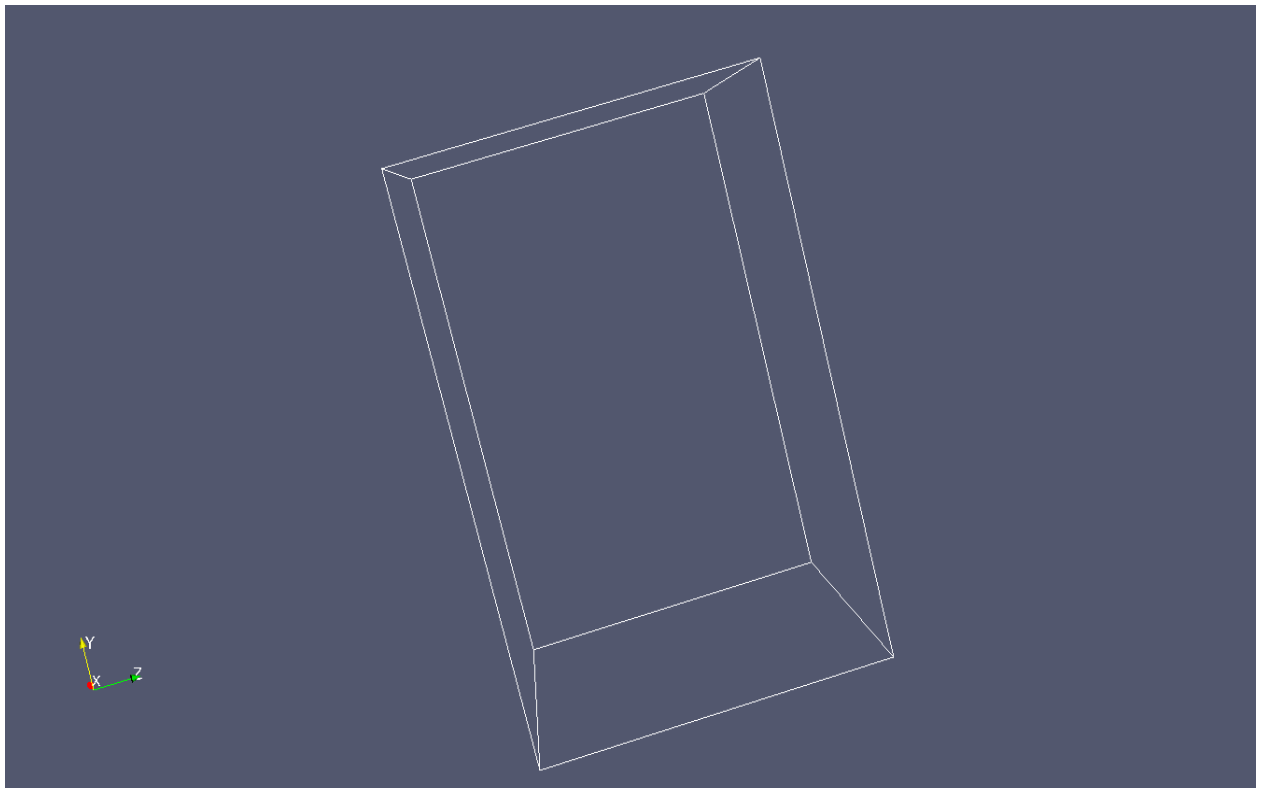








Rotation or Wiggles?



Conclusions