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On the dynamics and heating be transverse waves in simulated coronal loops

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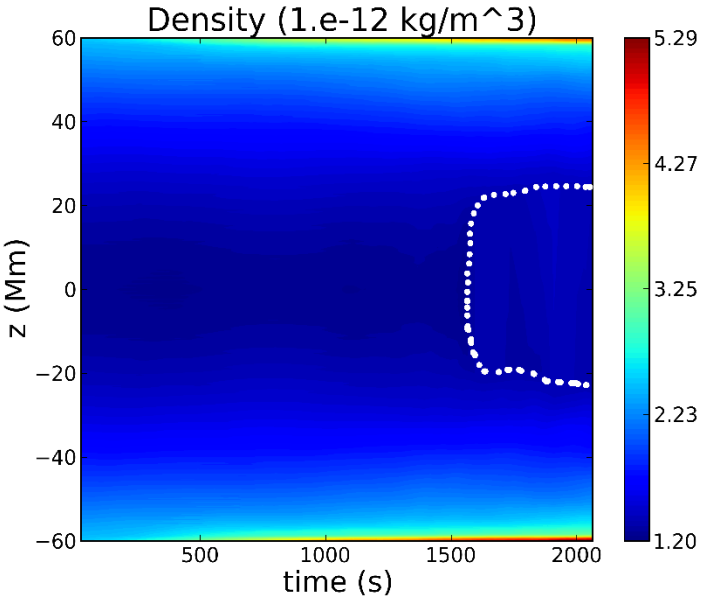
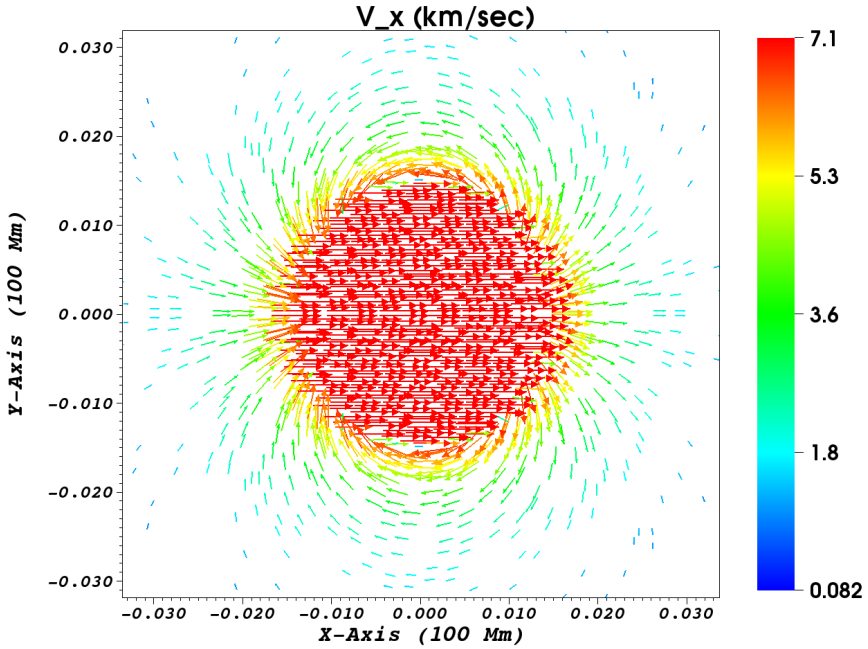
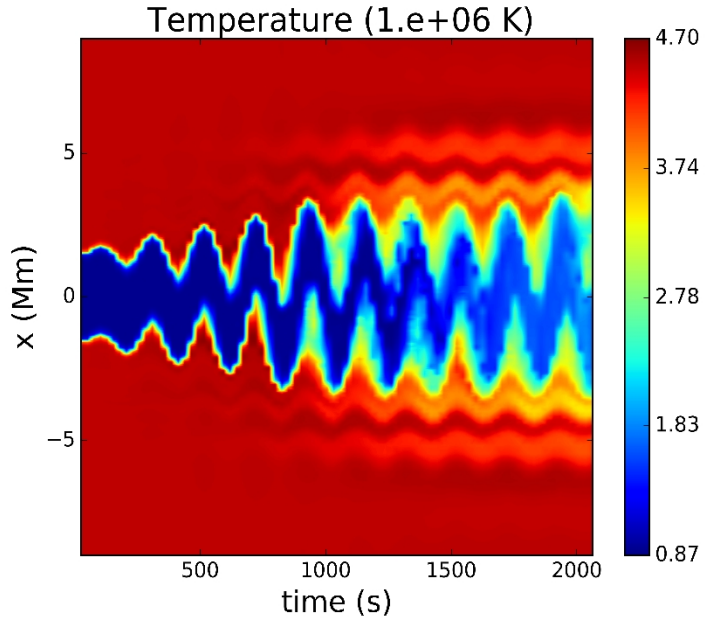
Numerical Model

- 3D gravitationally stratified, straight, flux tube.
- Density ratio ~ 5 (dense, cold loop).
- Continuous, moving, monoperiodic footpoint driver.
- Frequency of the driver ~ eigenfrequency of the tube.
- Anchored, non-driven footpoint.







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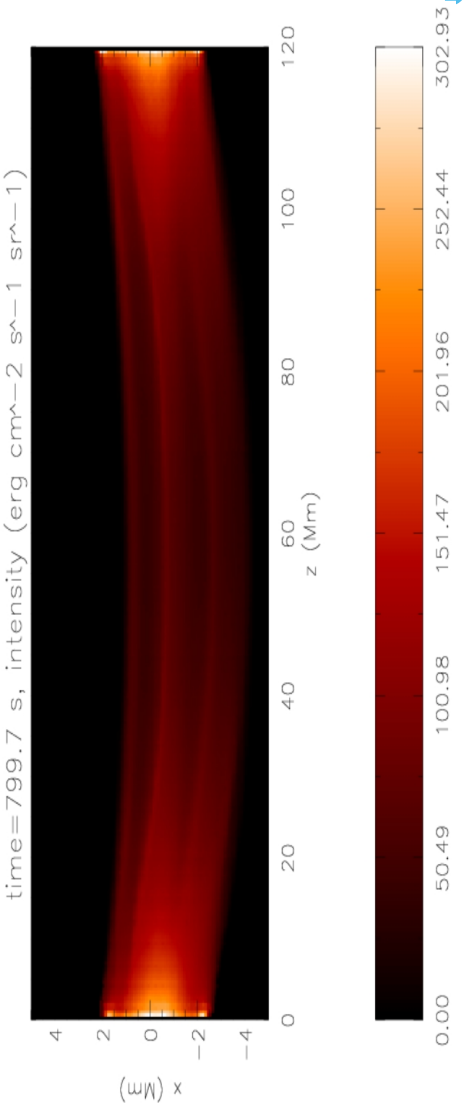
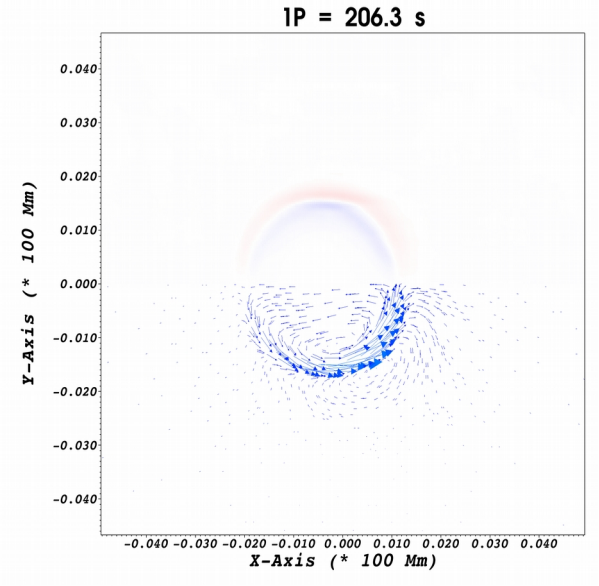
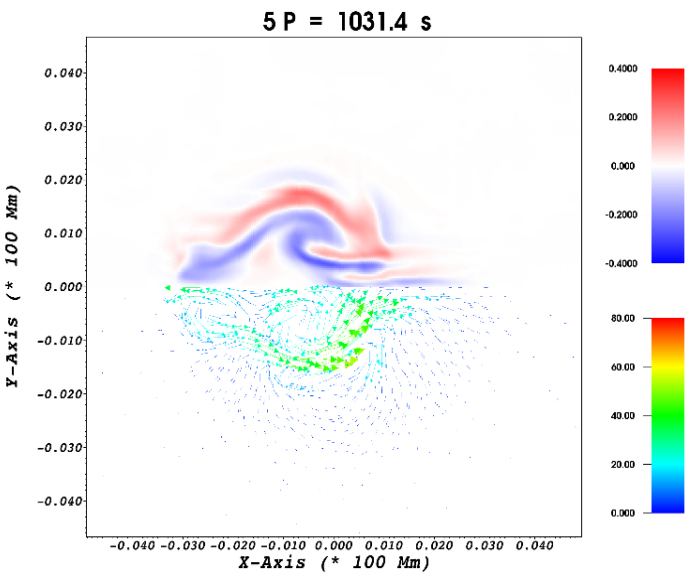
Vorticity and Velocity field at the apex







- Propagating wave turns into a “standing” kink wave (m=1).
- Initially increasing oscillation amplitude.
- Resonant layer => K.H.I. => fully convective loop.
- Forward Modeling in AIA 19,3 nm channel (Van Doorsselaere et al. 2016)
- Development of apparent strands (see also Antolin et al. 2014).

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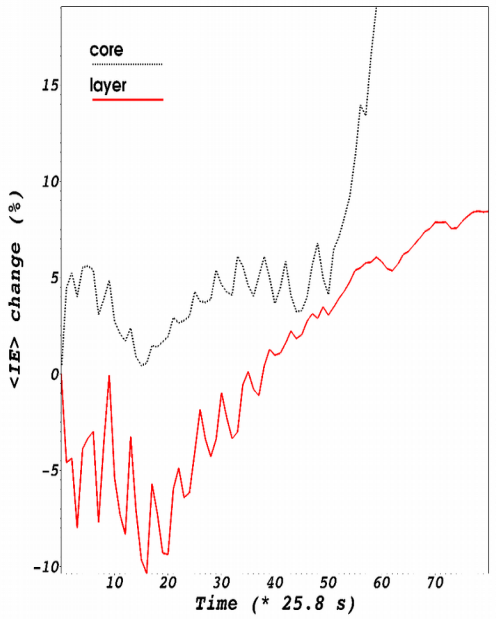
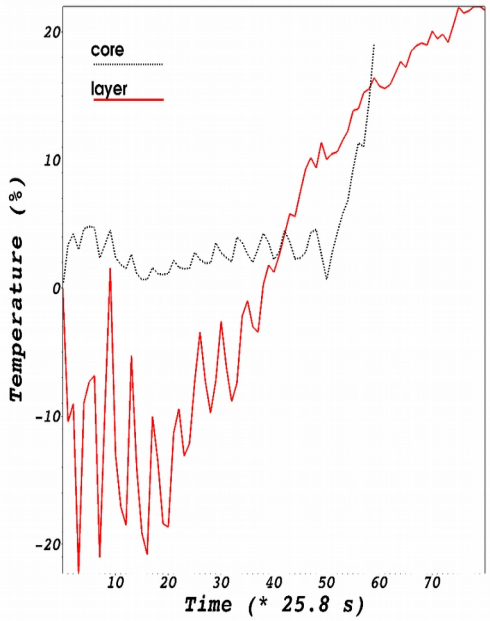
Average Internal energy and Temperature at the apex





- **Core region** (minimal mixing): agreement <T> - <I.E.> => actual heating
- **Layer** (extensive mixing): no agreement <T> -<I.E.> => apparent heating

References

- Antolin, P., Yokoyama, T., & Van Doorsselaere, T. 2014, ApJ, 787, L22
- Van Doorsselaere, T., Antolin, P., Yuan, D., Reznikova, V., & Magyar, N. 2016, Front. Astron. Space Sci.

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