EGU General Assembly 2022

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# Flux-tube-dependent propagation of Alfvén waves in the solar corona

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May 23, 2022

# Background

- Alfvén waves generated by the interaction of photospheric convection with magnetic fields.
- **Leading theory**: heating and acceleration of the solar wind via (Alfvénic) wave-turbulence

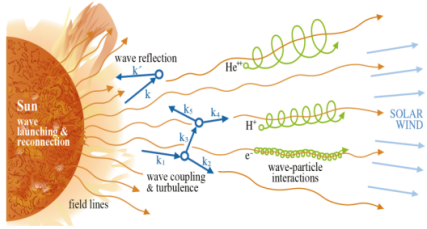



**Figure:** Cartoon illustrating various kinetic dissipation processes in the solar corona. (Image courtesy of B. Chandran, M.Lee, K. Donahue)

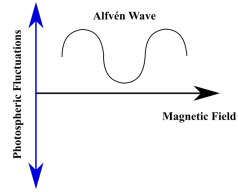
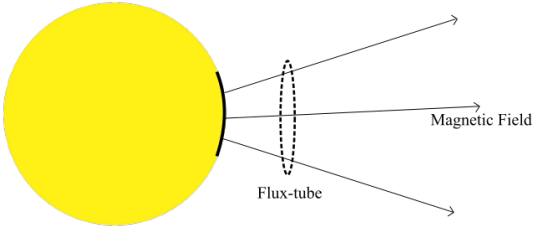
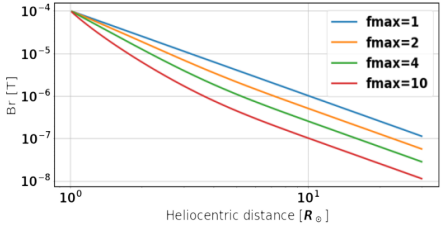



**Figure:** Cartoon illustrating the generation of Alfén waves.

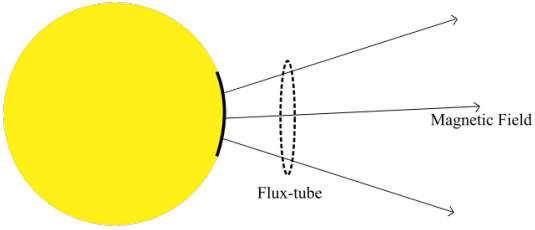
# Modeling the Solar Corona

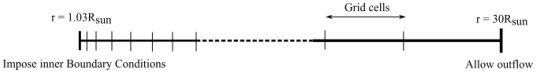



- The model supports various rates of expansion for the considered flux tube.

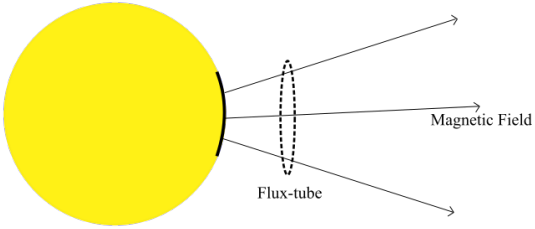
# Modeling the Solar Corona

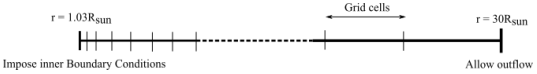



- The model supports various rates of expansion for the considered flux tube.
- The solar wind is modeled in a 1D MHD simulation.

# Modeling the Solar Corona



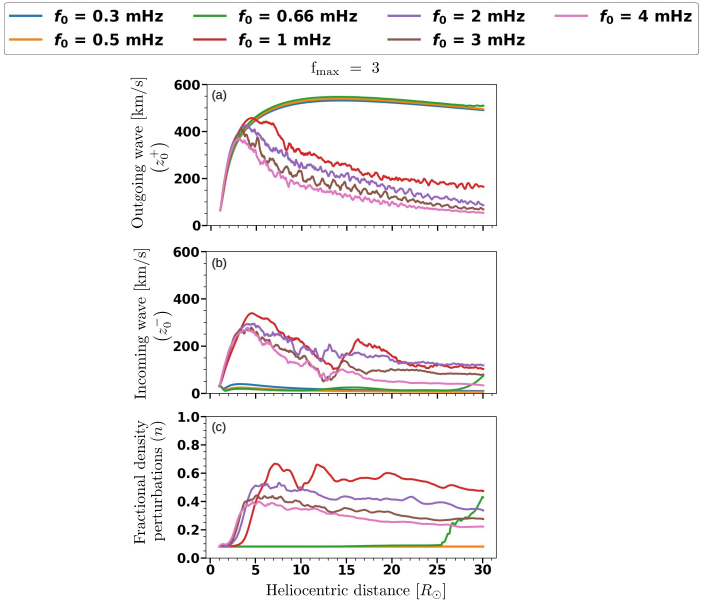




**Study the response of the corona upon injecting single mode Alfvén waves at the base of the corona.**

# Parametric Decay Instability

**Workflow**

1. Generate Solar wind.
2. Inject Alfvén Wave.



# Conclusion

- Developed a single-fluid MHD simulation
- Studied the solar wind response upon injecting a monochromatic pump alfvén wave.

Sishtla, C. P., Pomoell, J., Kilpua, E., Good, S., Daei, F., & Palmroth, M. (2022). Flux-tube-dependent propagation of Alfvén waves in the solar corona. Astronomy & Astrophysics, 661, A58.