

Increasing the Accessibility of Solar Science through Interactive Demonstration

Benjamin Miller^{1,2}, Tishanna Ben¹, John Williams¹, Claire Raftery¹

¹National Solar Observatory, ²Tufts University

Email: bmille08@tufts.edu

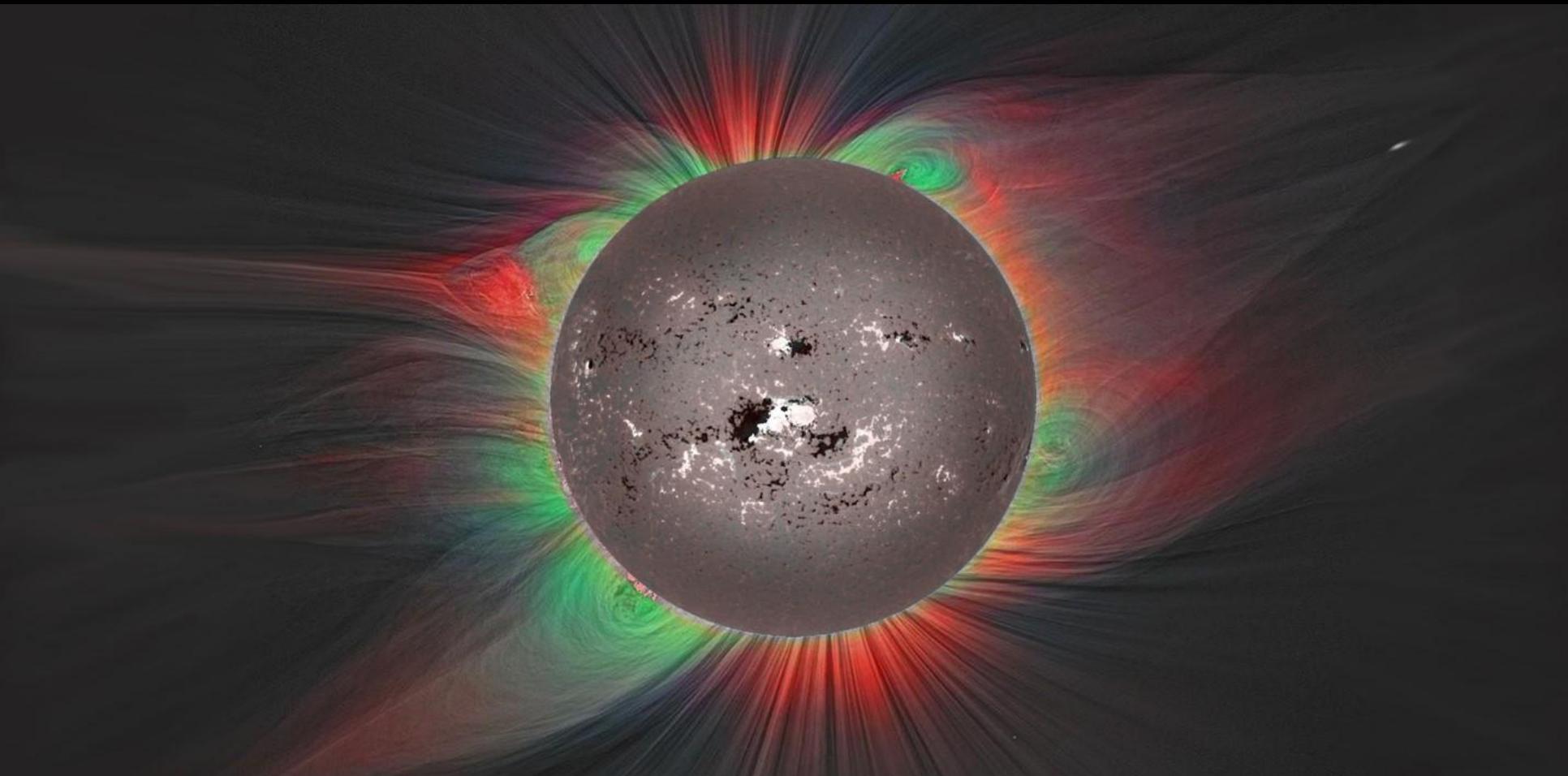




Mission Statement



- Our goal has been to design a demonstration to increase the accessibility of an important scientific technique utilized by the Inouye Solar Telescope.



Credit: M. Druckmucker/NSO/AURA/NSF

SPECTROPOLARIMETRY

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Referring to a spectrum

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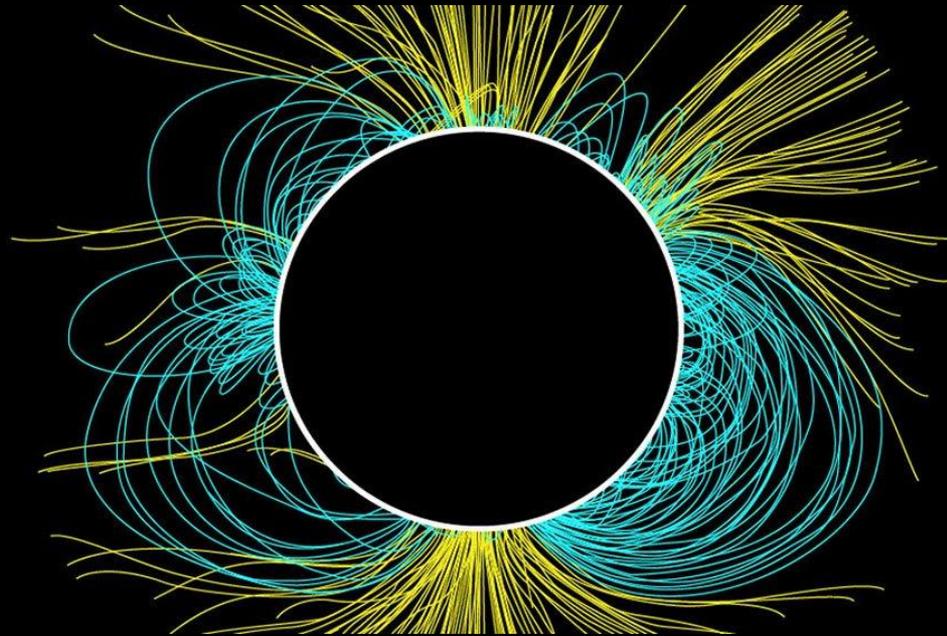
Referring to a spectrum



Referring to the polarization of light

What is Spectropolarimetry?

- Spectropolarimetry is a scientific technique that uses the polarization of light from the Sun to classify the strength and direction of solar magnetic fields present at the light's emission.



Spectropolarimetry: Polarization



- When light is produced in the presence of a solar magnetic field, it becomes polarized.

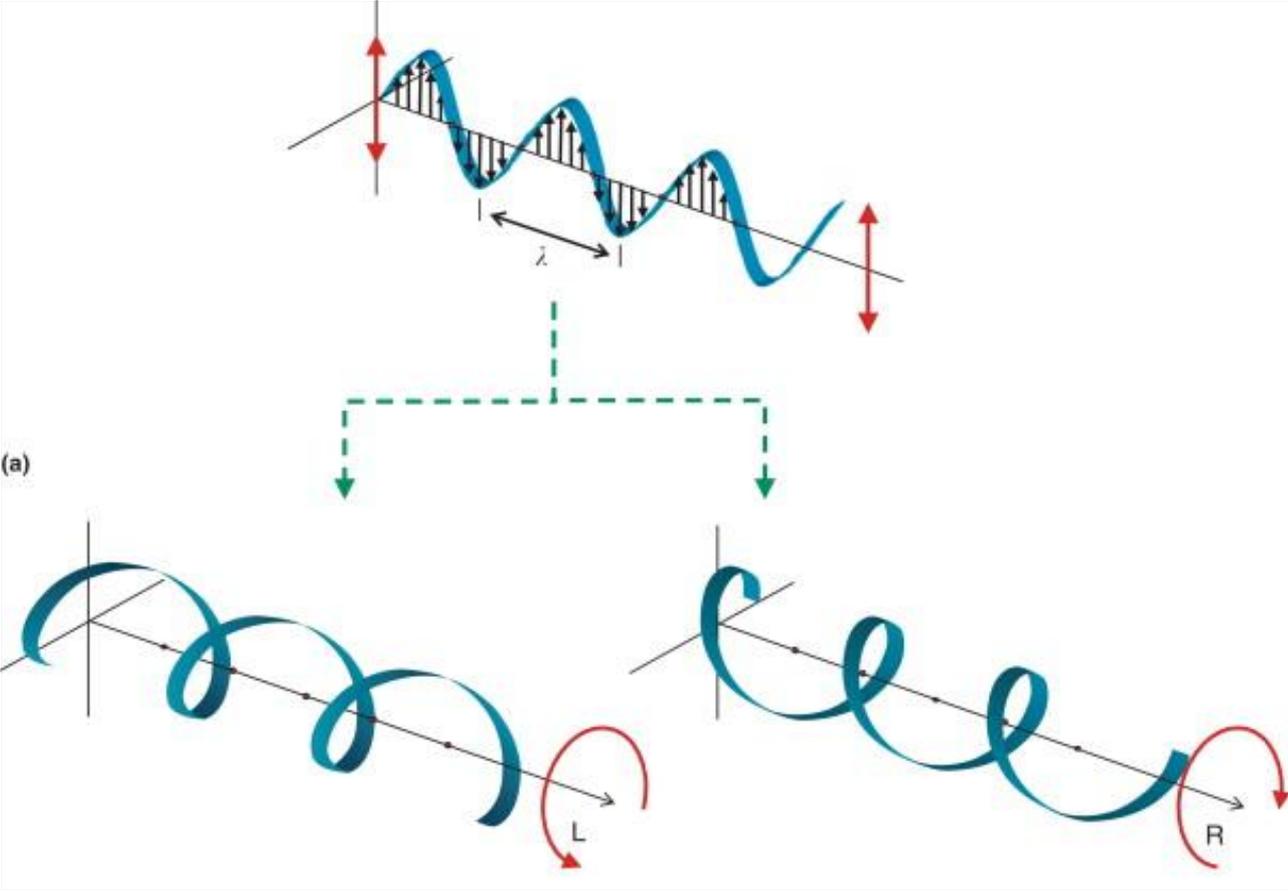
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- Polarized light is light that prefers to vibrate in a single direction
- There are three types of polarization: Linear, Right Circular, and Left Circular

Spectropolarimetry: Polarization

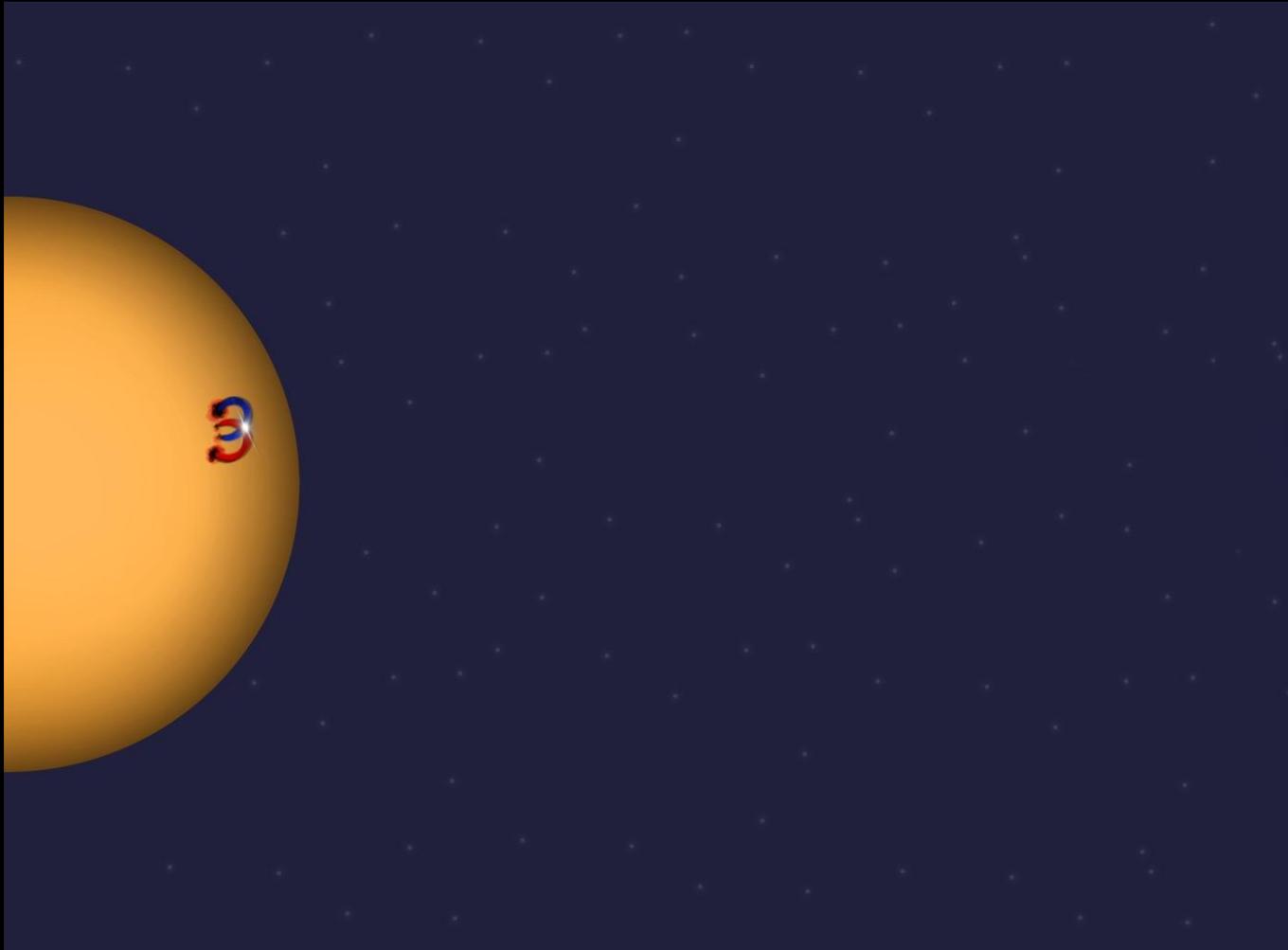


Credit: ScienceDirect.com

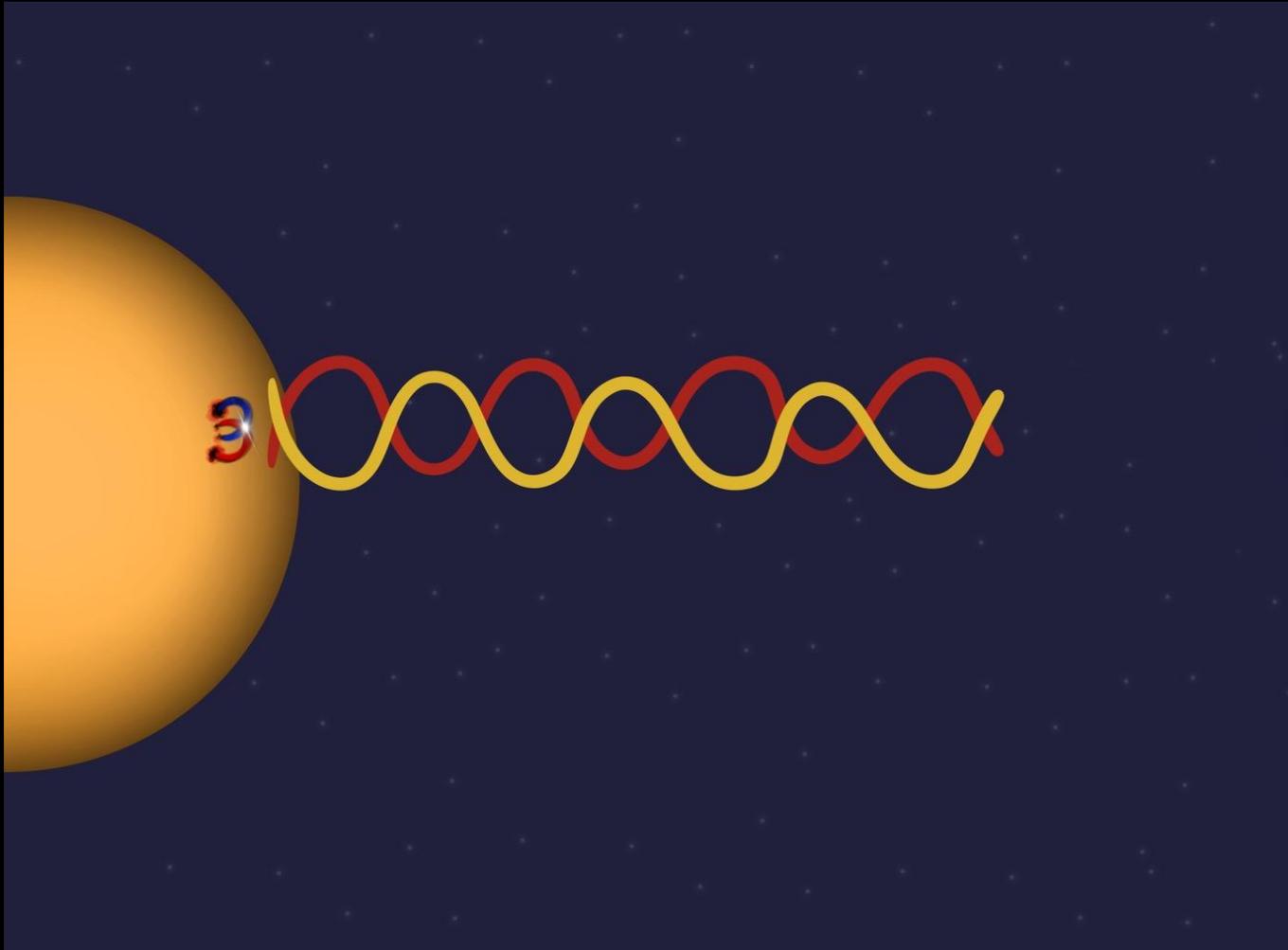
Applications of Spectropolarimetry

- How light is polarized by a solar magnetic field depends on the wavelength of the light
- By measuring the polarization of light from a location on the Sun at different wavelengths, the Inouye Telescope can reconstruct the magnetic field present at the formation of the light without direct measurement.

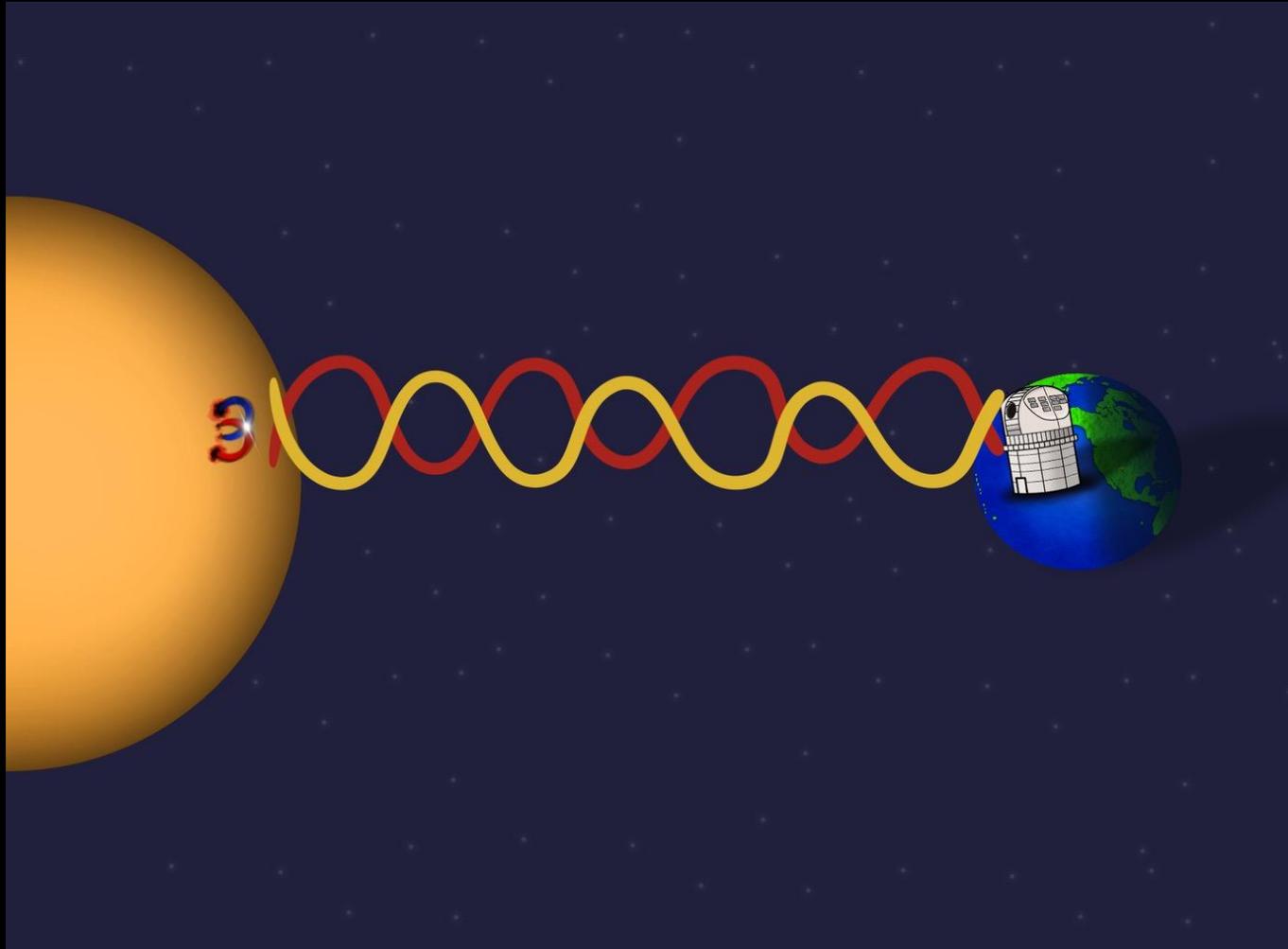
Spectropolarimetry in the Inouye Solar Telescope



Spectropolarimetry in the Inouye Solar Telescope



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- Spectropolarimetry is used in 4 out of 5 of the telescope's First Light Instruments
- It is a vital technique for our understanding of the coronal magnetic field and the origin of certain solar phenomena



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2. Increase the accessibility of a complex scientific technique through kinesthetic interaction
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4. Make it FUN

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 1. Light moves like a wave
 2. A magnetic field causes light to vibrate preferentially in one direction
 3. By looking at which direction different colors of light vibrate, we can learn about the original magnetic field
- Next: How can we make this process interactive and fun?

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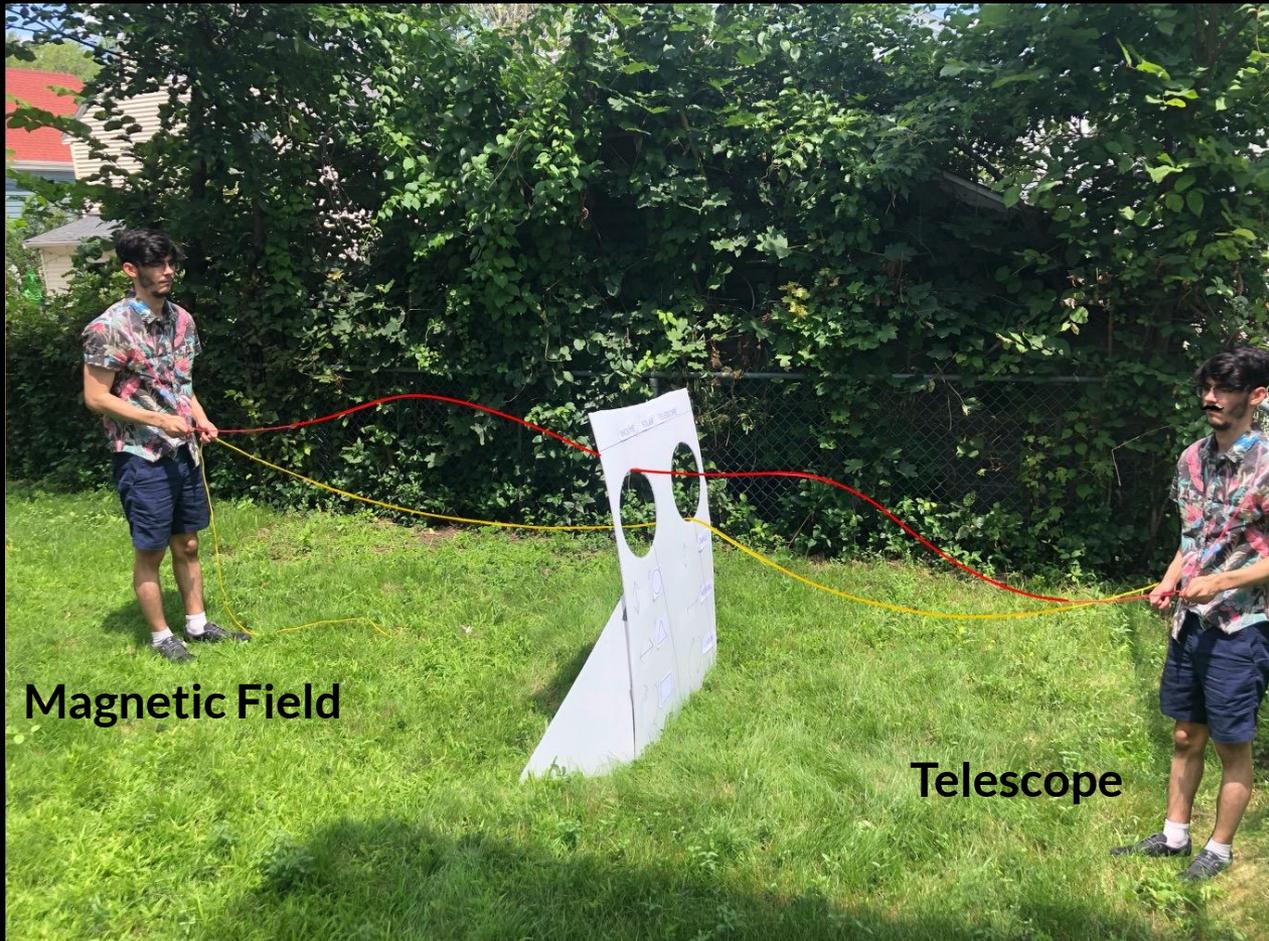
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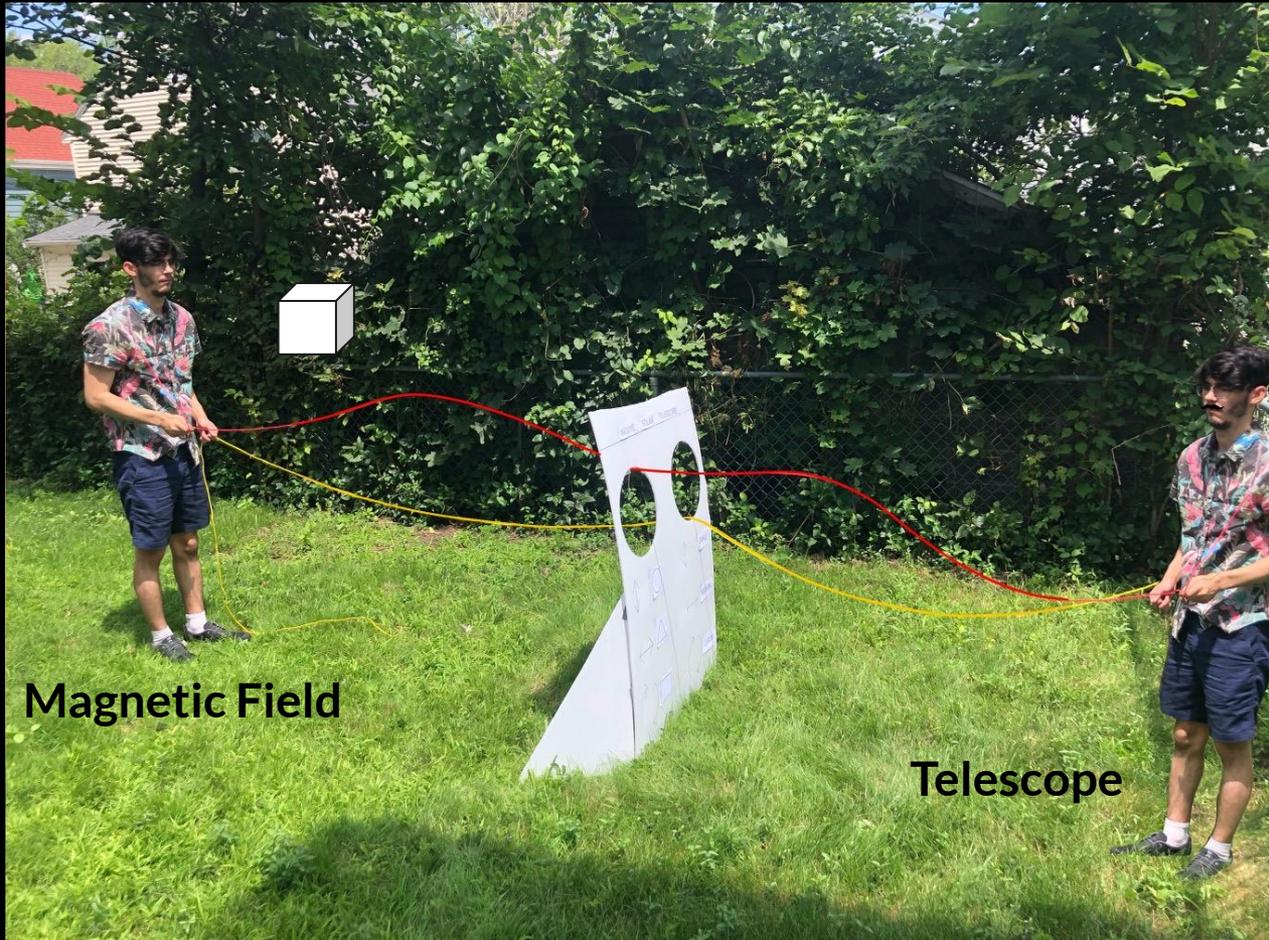
The Activity



Magnetic Field

Telescope

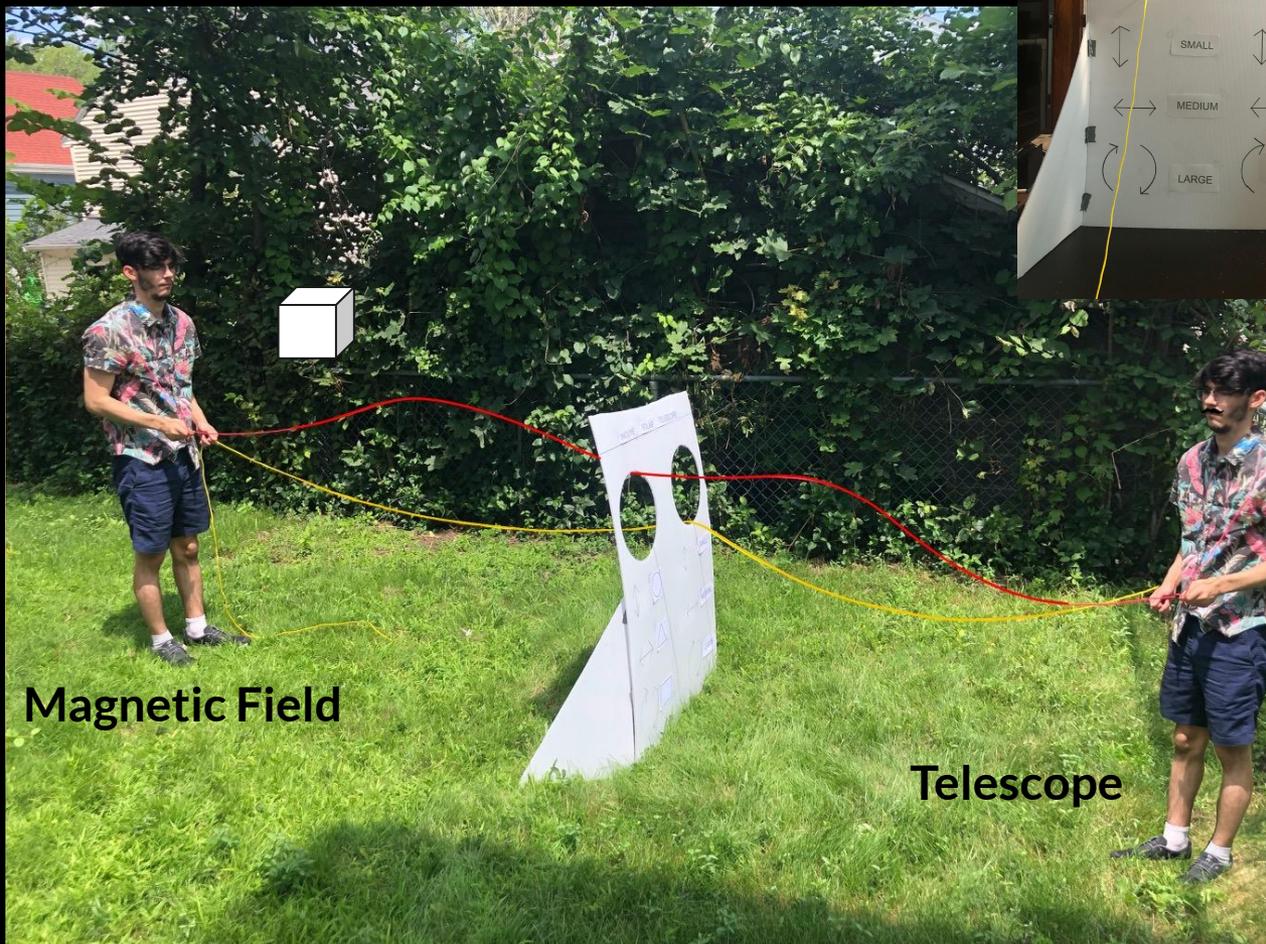
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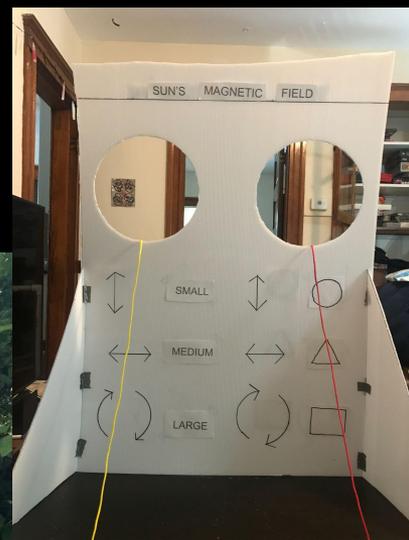
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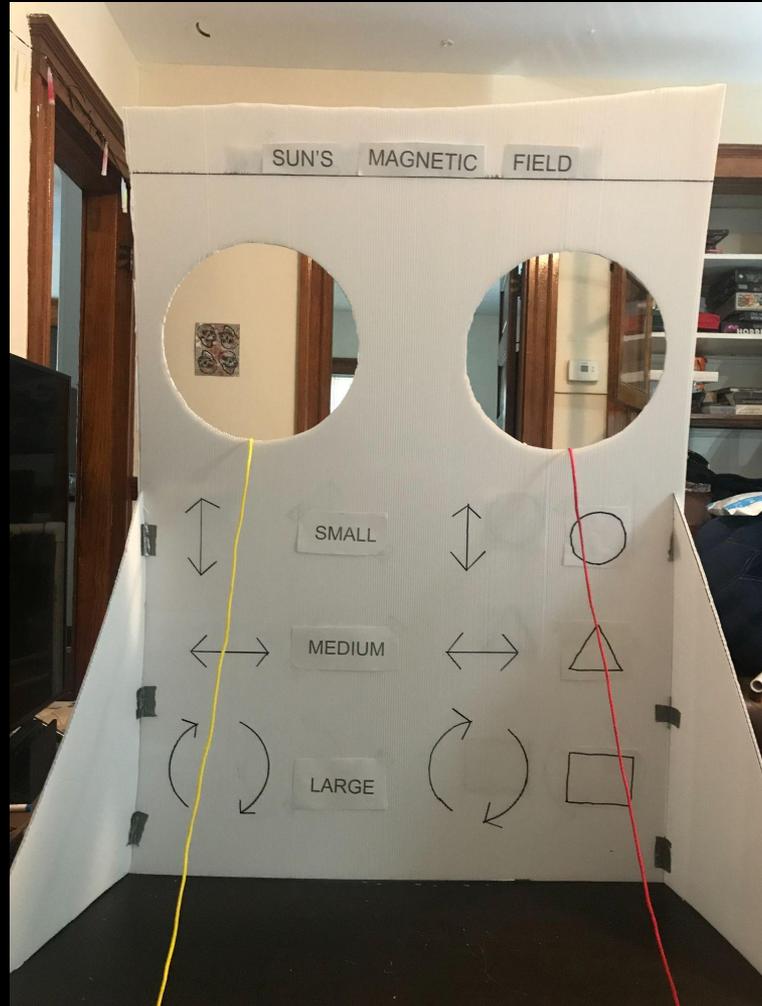


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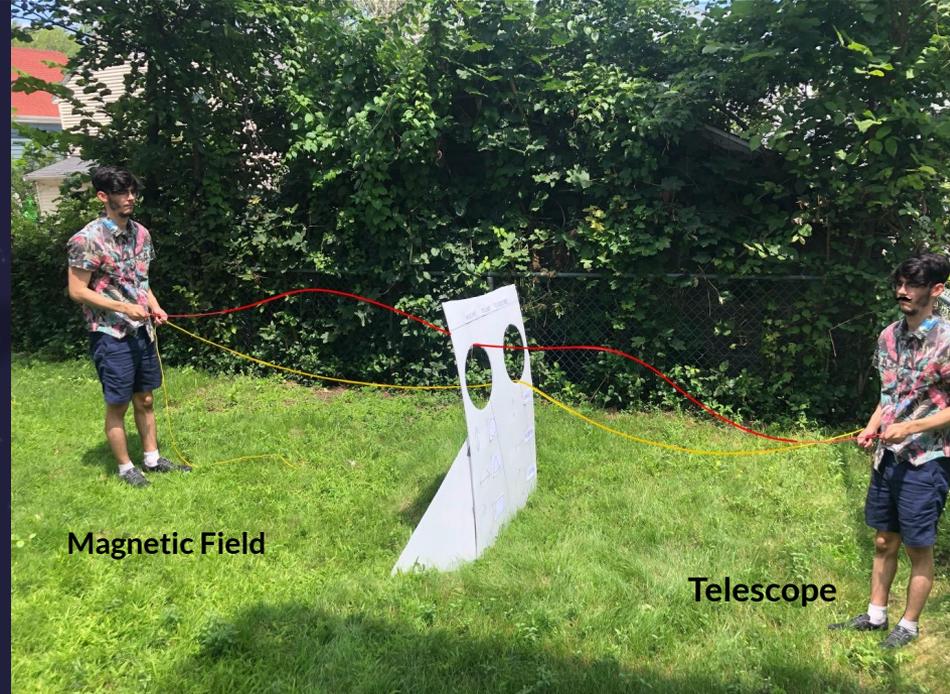
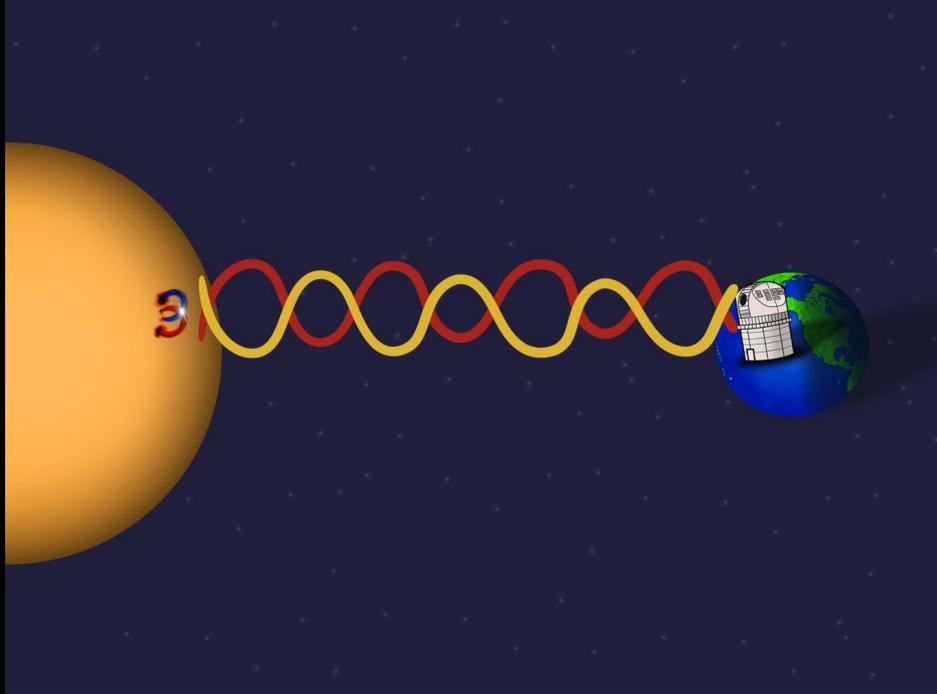
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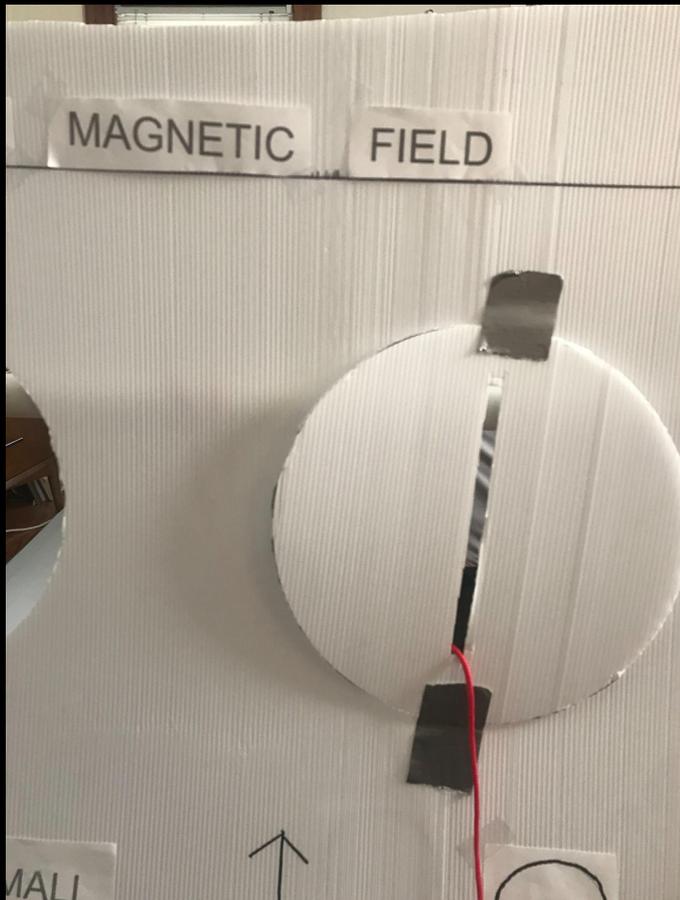
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- Participants then have the opportunity to take part in an interactive activity, analogous to the overall process of spectropolarimetry
- We conclude with a discussion of the activity and the applications of spectropolarimetry in the world



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- When tested with a focus group comprised of fellow REU interns and university students, the demonstration was received positively.

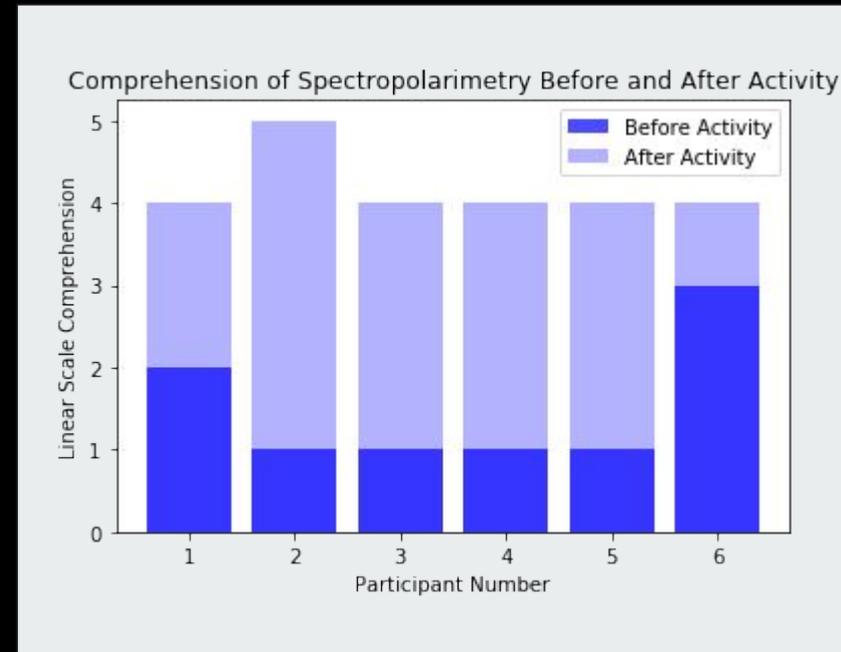
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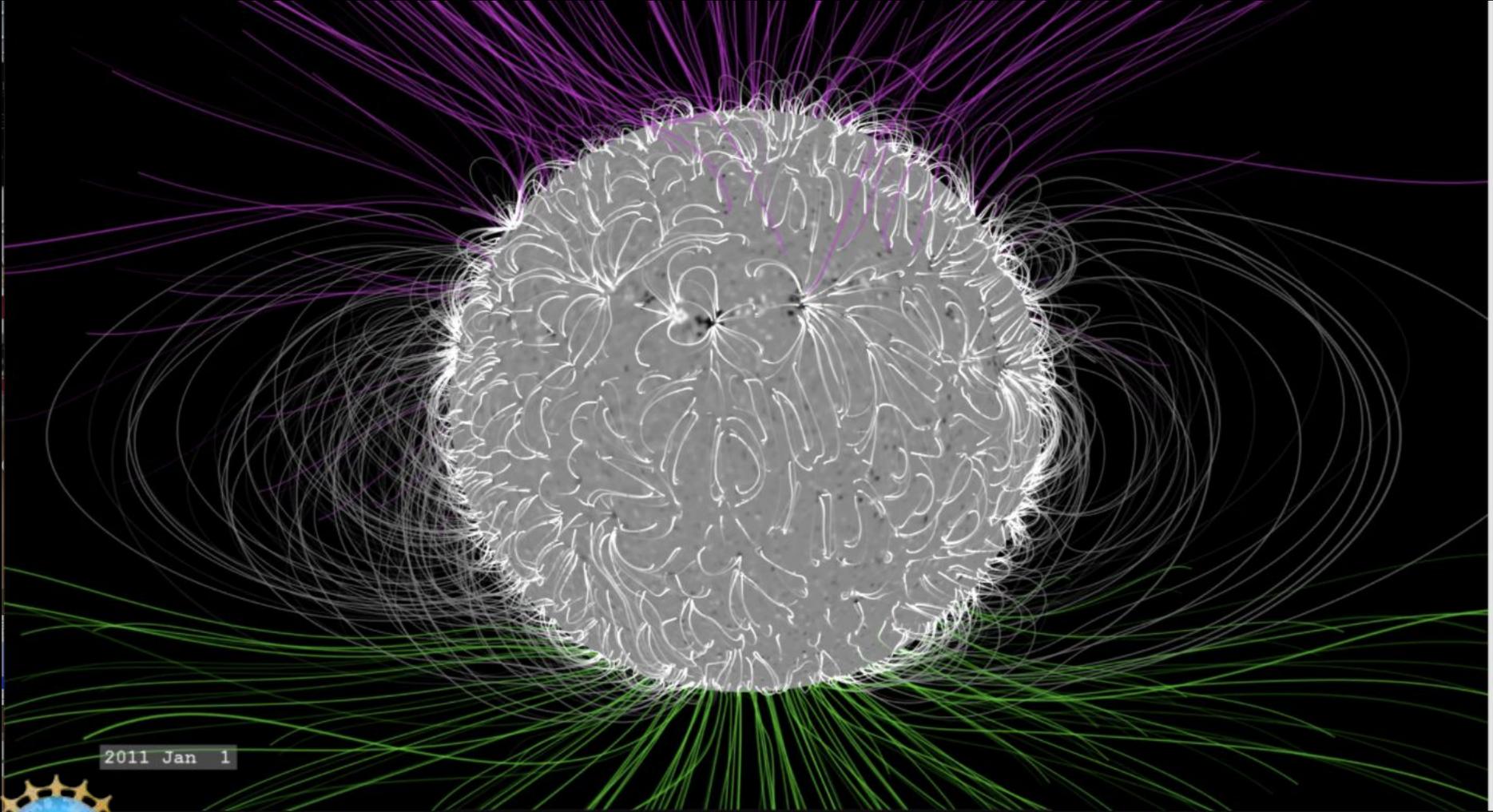
- Expand the focus group, with an emphasis on increasing the diversity of scientific backgrounds participating in the demonstration.
- Develop alternate versions of the demonstration for groups at different education levels. For example, by incorporating a moving object and adding direction of motion and speed as strings, we could make the demonstration more suited to a higher level of education.

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- Explore the use of this form of interactive demonstration in other areas of solar physics.

Thank you!



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Acknowledgements



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