

The background of the slide is a deep space image showing a vast field of stars and a prominent, glowing structure that resembles a galaxy or a large nebula. The structure is elongated and has a complex, filamentary appearance with various colors including blue, white, and hints of red. The stars are scattered throughout the field, with some appearing as bright points and others as faint specks.

# Magnetic structures in Solar Wind

**Research Team:**

**William Matthaeus**

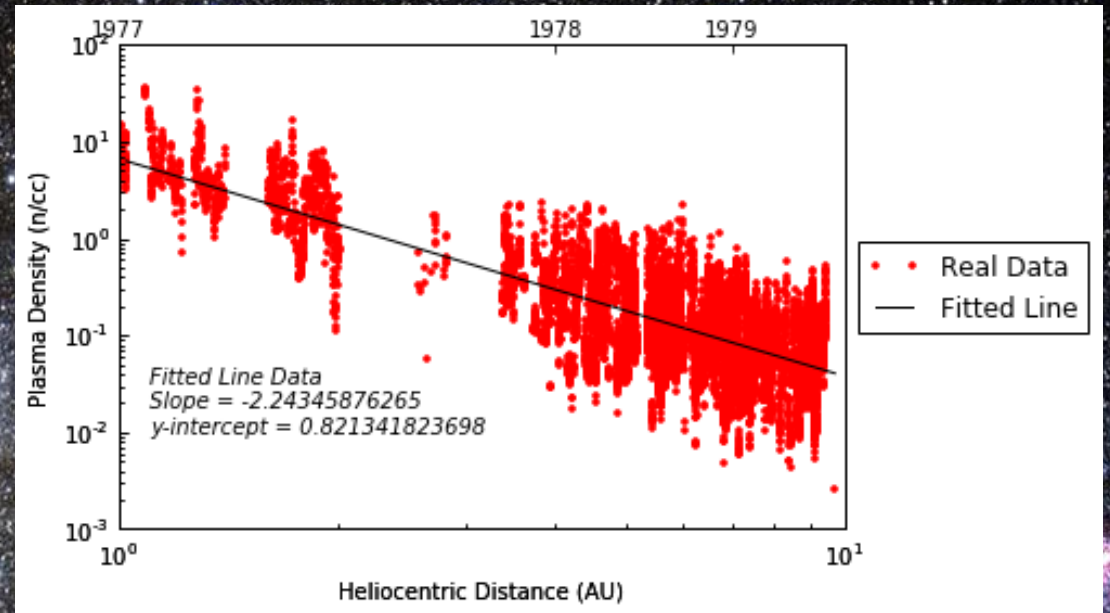
**Tulasi Parashar**

**Manuel Cuesta**



# Winter Session Pre-Research

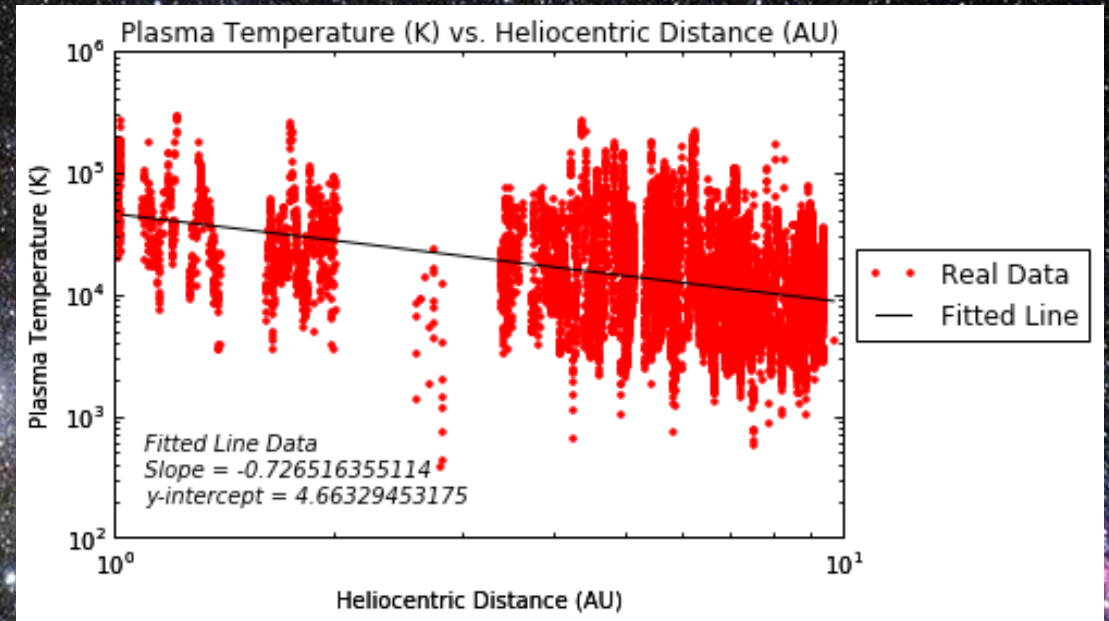
- Derived the relation between Plasma Density and Heliocentric Distance
- Mathematically:  $\rho \propto r^{-2}$
- Voyager Data:  $\rho \propto r^{-2.24}$





# Winter Session Pre-Research

- Derived the relation between Plasma Temperature and Heliocentric Distance
- Mathematically:  $T \propto r^{-4/3}$
- Voyager Data:  $\rho \propto r^{-.727}$   
 $\approx r^{-3/4}$





# Winter Session Pre-Research

- **Python Programming -> Data Manipulation/Handling**
- **Efficient data reading and learning best ways to implement these structures in functions**
- **pandas -> DataFrame/Series**
  
- **Learning Terminology/Concepts (Parker Spiral, Magnetic Reconnection, Review of the Maxwell's Equations, etc.)**
- **Now ready for the Summer**



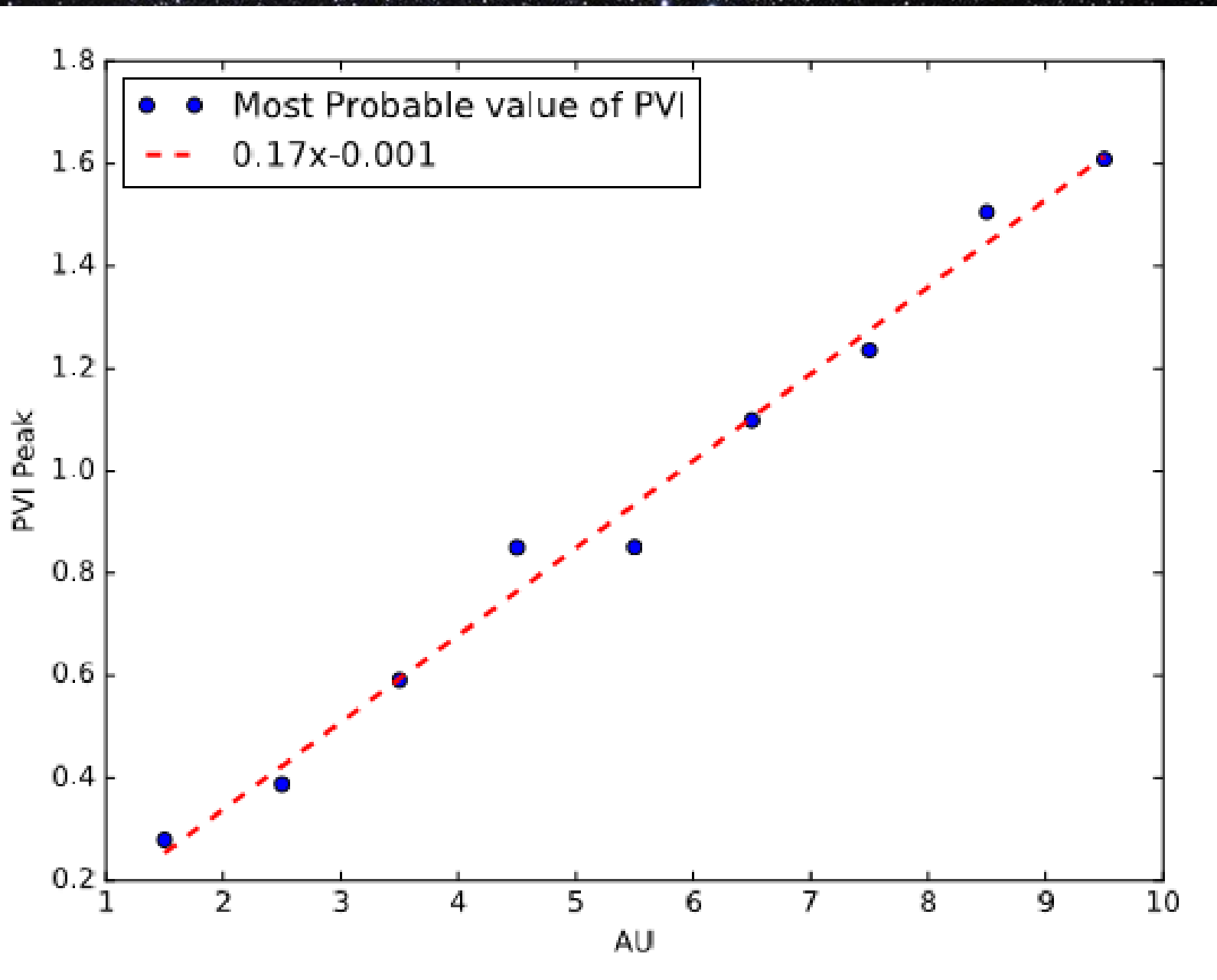
# Summer Session

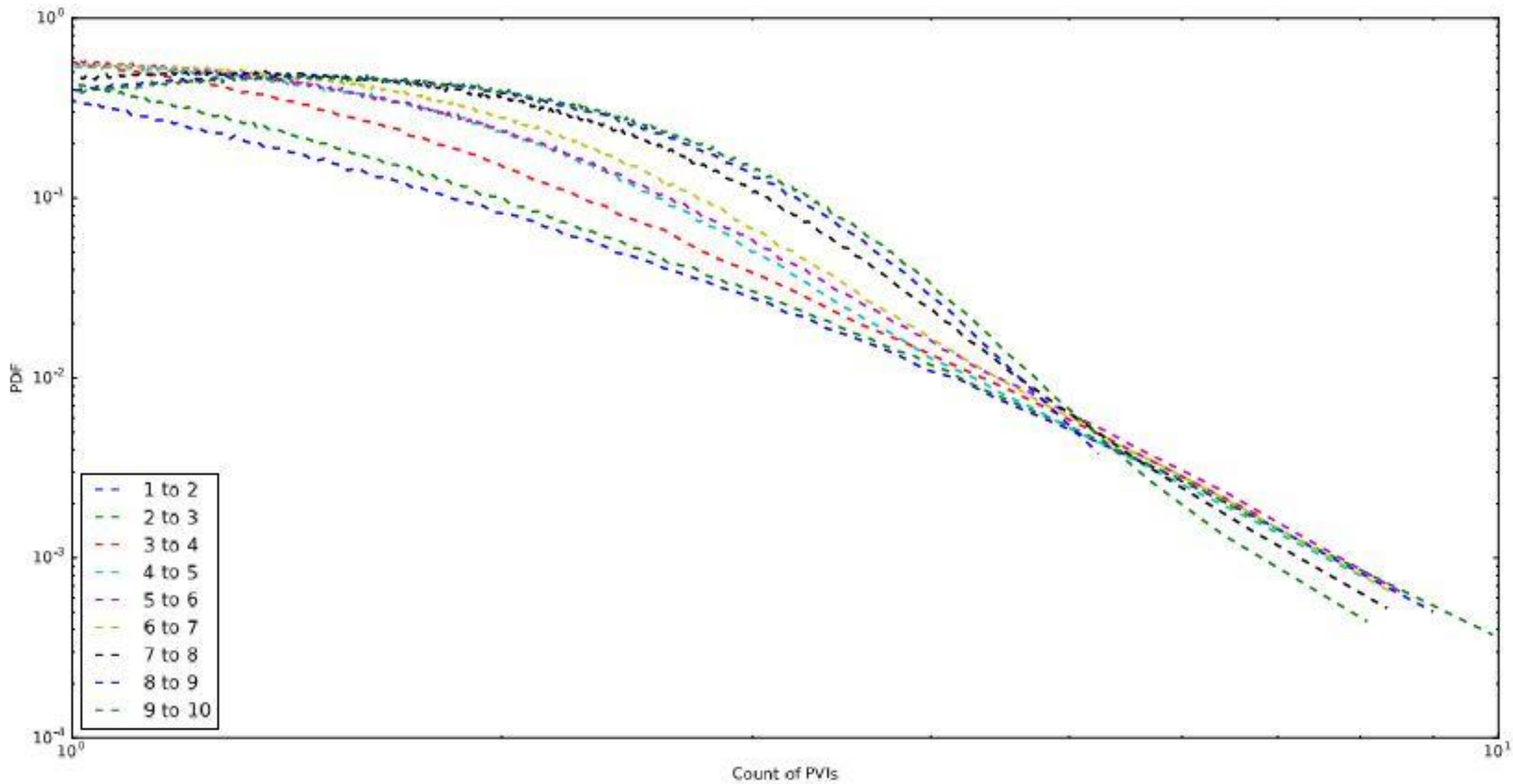
- **More Terminology (Partial Variance Increment, Structure Function, Correlation Function/Coefficient, Probability Density Function)**
- **Scripts with defined functions**
- **Data cleaning of statistical outliers, missing data, and unrealistic values**













A deep-field astronomical image showing a vast field of stars, likely from a galaxy. The stars are densely packed and exhibit a variety of colors, including blue, white, yellow, and red. A prominent bright yellow star is visible near the center. The background is dark, with some faint, diffuse structures suggesting a galactic environment.

Further and more accurate results to come

Any Questions?