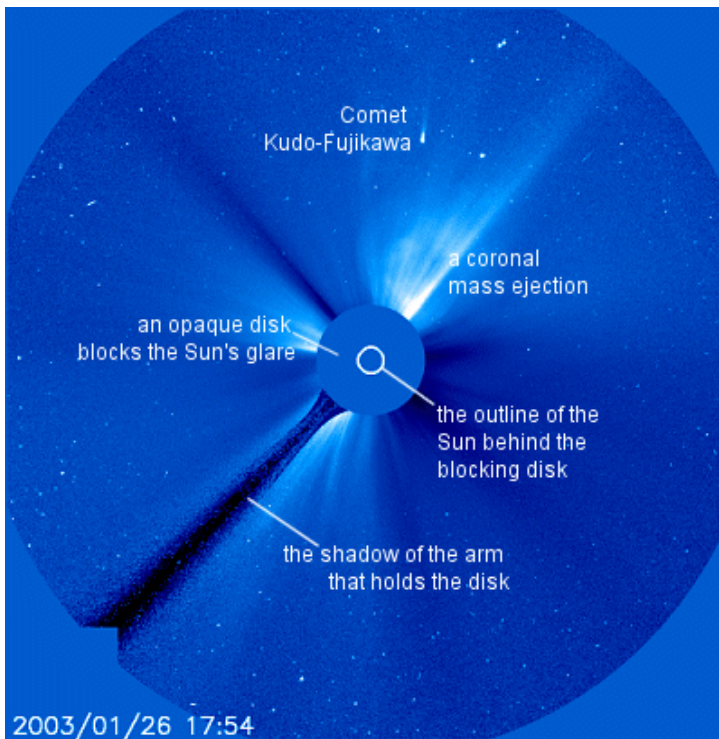


## CME's and Coronagraphs Activity

As you know, CME's (coronal mass ejections) are explosive releases of solar energy and material that, if aimed at the earth, can be of major concern. In this activity, you will gain a better understanding of how space scientists observe and study CME's.

The LASCO telescope on SOHO uses a disk to block out the sun's light so that the solar atmosphere can be observed. This type of image is called a **coronagraph**. By doing this, solar activity that would otherwise not be observable can be seen. Of particular interest are CME's.

The image below is a coronagraph.



Courtesy of SOHO/LASCO consortium. SOHO is a project of international cooperation between ESA and NASA

### Preliminary Questions:

1. Based on the CME in the image, and the outline of the sun, make a statement about the relative size of a CME compared to the sun.
2. Since the SOHO satellite lies on the earth-sun line, this coronagraph is really an image of the sun from the vantage point of the earth. Do you think the CME pictured above is aimed at the earth? Explain your reasoning.

## Materials

- Baseball
- Ring stand
- Wooden disks the size of a quarter

## Procedure

1. You will be arranged in a horse shoe shape around the room and given a wooden-disk the size of a quarter. The disk will represent the disk in a coronagraph.
2. A baseball supported by a ring stand is on a desk in the middle of the room. The baseball represents the sun
3. Hold the quarter at arms length to block the image of the ball. Adjust the position of the disk until the disk blocks approximately twice the ball's diameter within your vision. Try to have the disk and the ball at approximately the same height.
4. Your teacher will now hold an inflated balloon on the surface of the ball. The balloon represents a CME. The image you see simulates a coronagraph during a CME.

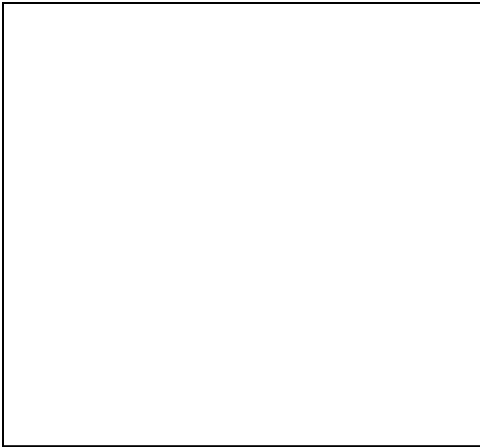
## Results

1. In the box below, sketch your coronagraph



Based on the sketch, what can you conclude about the direction of the CME and whether it should be of concern for space weather scientists on earth?

2. Your teacher will now change the location of the balloon. In the box below, sketch your new coronagraph.

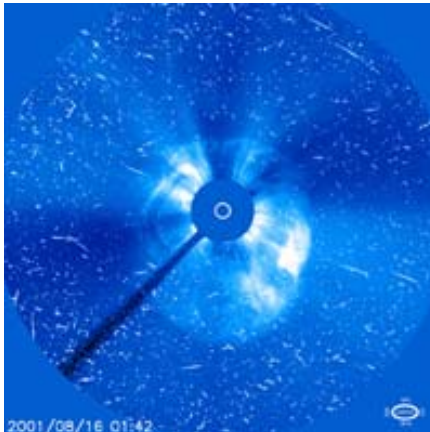


Based on the sketch, what can you conclude about the direction of the CME and whether it should be of concern for space weather scientists on earth?

Compare your findings with other students in the class.

### Questions

1. Can you make any conclusions about the general appearance of a CME and its direction with respect to the earth?
2. Would you consider the CME pictured below to be of concern for the earth? Why?



Courtesy of SOHO/LASCO consortium. SOHO is a project of international cooperation between ESA and NASA