NASA/HEAT Rice U Status Report – July 2021

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- ***Underserved Student Event: South Texas***

We participated in the "South Texas STEM event" on June 30 and July 1, 2021. The event was held at Santa Rosa High School, Santa Rosa TX. We took the Discovery Dome and did training for all 300 students (from pre-school to High School) on the Sun, eclipses, and the upcoming annular and total eclipses which will be very near their location. (They will experience the sun 85% covered for both events.

On June 30, as previously reported, we brought each child into the dome and taught them about eclipes then they went outside for demonstration of safe solar observing techniques. Each student and teacher received a pair of eclipse glasses and an envelope to save them in.

On July 1, the students returned to the dome for our planetarium show on Magnetism, https://mms.rice.edu/mms_planetarium_show.html which includes heliospheric physics, the aurora, reconnection, and the MMS mission. We also demonstrated to the students our "3D printed magnetosphere" – we had gotten the plans from the Aurorasaurus group and printed a copy at Rice U. We now have a 3D printer to make more copies as needed.

Participants: South Texas STEM Academy, June 30-July 1

Students:	Elementary 110; middle school 120; High School 70
Teachers:	Elementary 10; middle school 10; High school 8
Demographics:	100% hispanic; 50% female (all students and most of the teachers)

Figure 1: High school students learning about the magnetosphere using the 3D printed magnetosphere model, which includes the major plasma regions (plasmasphere, ring current, plasma sheet, aurora, cusp). They then went into the dome and saw the Magnetosphere show.

Figure 2: High School students learning safe eclipse viewing techniques from members of the South Texas Astronomy group.

- ***Underserved Student Event: Houston Hispanic students***

We are on the organizing committee for the Houston STEM event at the Lone Star Flight Museum, scheduled for October 2. We are planning for 400 hispanic students plus adult chaperones (teachers or parents). The chief organizer is the "Gathering of Eagles", with help from the Flight Museum, the West Point Foundation, Rice U and the University of Houston. The event will feature a tour of the museum and booths highlighting STEM careers.

The website is set up https://goestemfest.org and the registration is open. We are inviting lower-income primarily hispanic student to participate. We are planning on having a booth to

Eclipse Animation Update

The final animations to be created under our initial project is to add annular eclipse animations to our other seven eclipse animations that we created previously for the 2017 event. We have identified two animations to be done (in 4K x 4K fulldome fisheye for planetariums, but also available in pre-warped for mirror systems and in flatscreen). We have been working with the animator (Don Davis) and have storyboards set up. We wlll need a no-cost extension to Sept 30 in order for him to finish up, however.

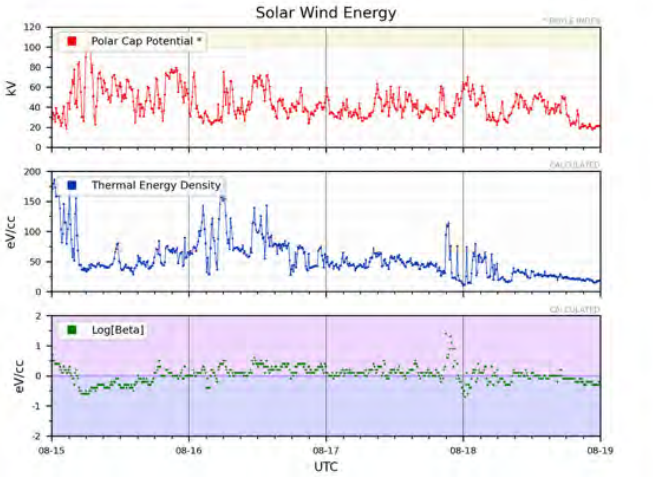
1. A closeup of the phases of the annular eclipse, much like the "Total Eclipse from the Earth" animation (https://space.rice.edu/eclipse/eclipse_animations.html) but larger, but not as large as the "Bailey's Beads" animation (on the same page).
2. An animation of the geometry of an annular eclipse, showing the umbra not quite touching the earth, leaving only the penumbral shadow. This would be similar to the "Eclipse Geometry" animation for the total eclipse, but would not include the lunar eclipse at the end and would "close in" to the shadow.

Space Weather Forecast Website

We are in process of rewriting all our image generating scripts for the space weather forecast pages. The forecast page is: https://mms.rice.edu/forecast.html and the solar wind input page is here: https://mms.rice.edu/realtime.html

We are redoing the graphs to make the time of the forecast more visible in the plots, and making the forecasts semi-transparent so that the uncertainty is easily visible.

Below is a sample plot of the realtime solar wind data for the past five hours.



We are beginning to look into updating the Space Weather software to see if we can get it to run on newer Mac's. (It runs on all Windows machines but not Mac Catalina or higher). https://mms.rice.edu/spaceweather_software.html Preliminary work on this taks appears to be hopeful, although it will make the download package larger (by about 500 MB). Images all work fine but videos and downloading need work. We will request a no-cost extension to finish the animation and this website work.