



# CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

<b>Name(s)</b> <b>Zoe Zawol</b>	<b>Project Number</b> <b>S1727</b>
<b>Project Title</b> <b>The Effect of Strong Magnetic Fields Caused by Broadcast Antennas on the Local Cosmic Ray Flux</b>	
<b>Objectives/Goals</b> My objective was to determine how the strong magnetic fields caused by broadcast antennas on Mt Wilson affect the local cosmic ray flux. In a different experiment last year, I detected a cosmic ray flux on Mt Wilson that was anomalously high for that altitude.	
<b>Abstract</b> <b>Methods/Materials</b> To perform my experiment, I used a home-made cloud chamber, containing 99% isopropyl alcohol that when chilled created a supersaturated vapor. Ionized cosmic ray particles passing through the vapor caused visible condensation trails that I video recorded against a grid. I also used a tri-axial magnetic field meter and GPS/altitude apps.  I conducted my tests in the very strong magnetic fields at the Mt Wilson broadcast antenna farm. For my control, I selected locations with weak magnetic fields far from Mt Wilson but at the same altitude. Replaying the videos, I counted the trails and calculated the cosmic ray flux per cubic centimeter per minute for each test and control.	
<b>Results</b> Only two out of the fourteen cosmic ray flux test results from the strong magnetic fields showed a flux consistent with the control fluxes whereas all of the other Mt Wilson flux measurements were lower, some even much lower.	
<b>Conclusions/Discussion</b> Based upon this series of tests, the results were opposite from last year's much-higher-than-expected Mt Wilson cosmic ray flux anomaly. I am tempted to conclude that the strong magnetic fields associated with radio broadcast antennas actually reduce the local cosmic ray flux, but believe that additional experiments are needed to conclude this with greater certainty. For example, if cosmic rays are being deflected by the magnetic fields, where are they going? Is it possible that the "missing" cosmic rays are being deflected nearby and can be detected by gathering additional data further away from the broadcast antennas' strong magnetic fields?	
<b>Summary Statement</b> I conducted my experiment to determine the effect of strong magnetic fields caused by broadcast antennas on the local cosmic ray flux.	
<b>Help Received</b> My dad helped purchase materials, bring me to my test locations, and talked with me about my ideas.	