



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

<b>Name(s)</b> Vivek Vijayakumar	<b>Project Number</b>  38120
<b>Project Title</b> Analysis of Magnetic Flux Surrounding Chromospheric Filaments Using Fibril Structure	
<b>Objectives/Goals</b> The project intends to find differences between fibril structure around quiet region filaments and active region filaments by calculating the magnetic flux around each. <b>Abstract</b> <b>Methods/Materials</b> Using an amateur setup consisting of an H-alpha (656.281nm) eyepiece#, 80mm refractor, equatorial mount, and high-speed monochrome camera, 48 images of ARFs and 76 images of QRFs were taken over a period of two months, with 8 ARFs and 9 QRFs being processable. They were captured in SharpCap, stacked in AutoStakkert!, processed in RegiStax 6, and analyzed in SAOImage DS9. <b>Results</b> Based on the 853 fibrils analyzed, and together 17 filaments, the average magnetic flux in ARFs is $736 \pm 97$ GWb, and in QRFs is $676 \pm 86$ GWb. The variations between magnetic flux in QRFs and ARFs is large however. The standard deviation between QRFs is 259 GWb, while is 273 GWb for ARFs. <b>Conclusions/Discussion</b> There is a lot of variance in magnetic flux from filament to filament regardless of whether it is a QRF or ARF, indicating the large variance in behavior between individual filaments of the same type. Due to the similar magnetic flux of ARFs and QRFs, the data suggests that the mechanisms producing both filaments in filament channels are similar.	
<b>Summary Statement</b> The project intends to find differences between two types of filaments on the Sun's chromosphere by analyzing the magnetic flux around them, using fibril tracers.	
<b>Help Received</b> I used my own equipment along with some online software, captured the data myself, processed it, and did the computations myself. Solar astrophysicist Sara Martin reviewed the project, along with Kin Searcy of the San Diego Astronomy Association.	