



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Colin S. Kovarik</b>	<b>Project Number</b> <b>J2114</b>
<b>Project Title</b> <b>Comparing EMF Emissions of Common Household Appliances</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Starting in the 1960s, concerns about electromagnetic fields (EMFs) have been raised. Multiple international organizations have researched these concerns, finding little or no evidence that EMFs are linked with cancer. However, scientists suggest it may be best to limit your EMF exposure. For my project, I compared EMF levels of older electrical appliances (5+ years old) to newer ones. I hoped to find whether older and newer appliances had a significant difference in EMF levels. I hypothesized that newer appliances will generate a lower electromagnetic field level due to their higher electrical efficiency.</p> <p><b>Methods/Materials</b> In total I tested 121 household appliances, (24 microwaves, 43 vacuums, and 54 hairdryers). Using a detector I purchased, I recorded the average electromagnetic field level at distances of 15, 30, 90, and 150 centimeters.</p> <p><b>Results</b> From my 484 tests, I learned that newer appliances had a lower electromagnetic field level than older ones. Of the 43 vacuums, older vacuums averaged 36.496% higher than newer ones. Older microwaves averaged 14.110% higher than the new ones, and of the 55 hairdryers, newer hairdryers averaged 13.373% lower than older ones.</p> <p><b>Conclusions/Discussion</b> In my project, I found evidence that older household appliances emitted more electromagnetic fields than newer ones. Although EMFs have not yet been proven to be dangerous, my findings could help if 60 Hz electromagnetic fields are proven to be a danger.</p>	
<b>Summary Statement</b> In my project, I compared EMF levels of older electrical appliances (5+ years old) to newer ones.	
<b>Help Received</b> My parents purchased the detector from Amazon, and drove me places to test. My friends and family members allowed me to test their home.	