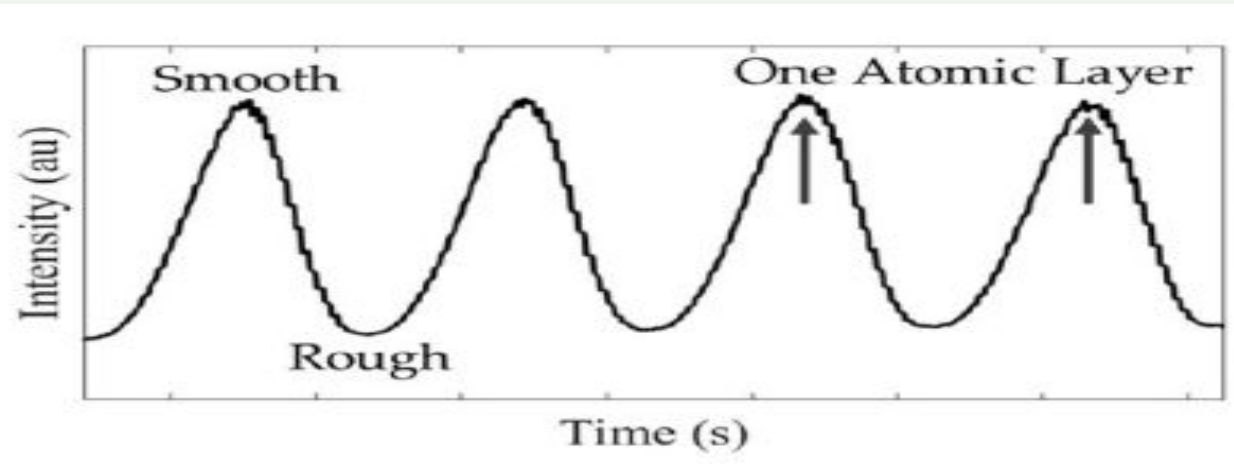


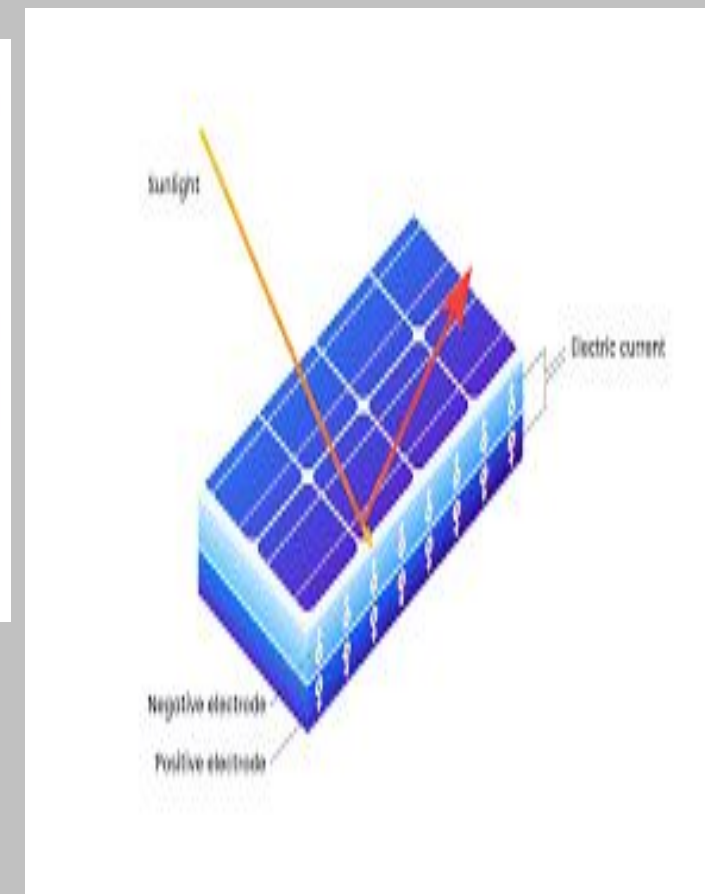
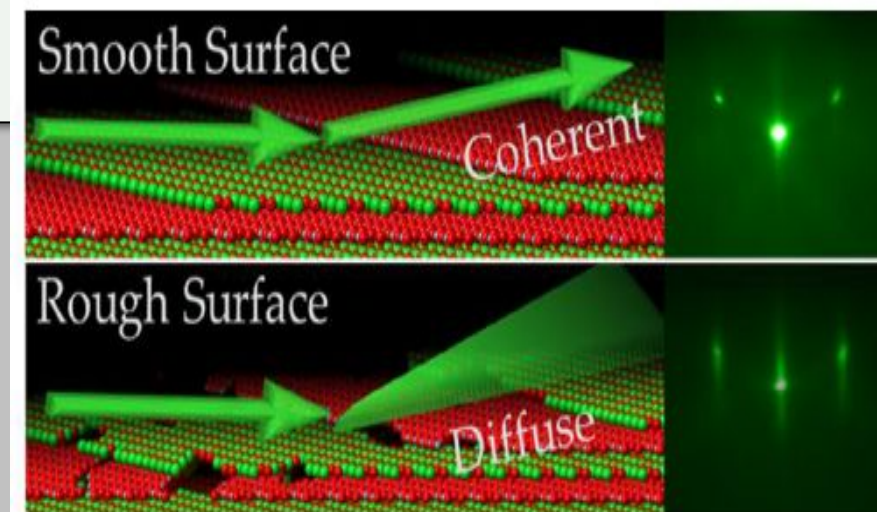
## Introduction

We are using pulsed laser deposition a - physical vapor deposition (PVD) technique where a high-powered pulsed laser beam is focused inside a vacuum chamber to strike a target of the material that is to be deposited - to grow thin films. We predominantly work on a class of materials called Perovskites with the molecular formula  $ABO_3$  where A and B are metals and O being Oxygen. These crystalline structures are placed ablated from a target, RHEED (reflection high energy electron diffraction) is used to determine the structure and measure the growth rate of these compounds. The smoother the surface, the brighter the light.



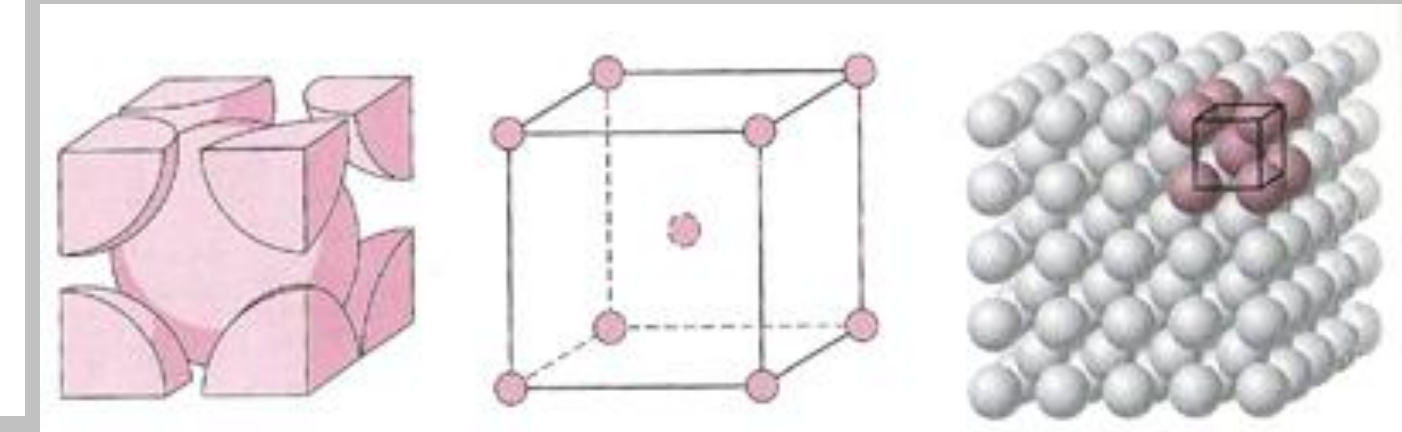
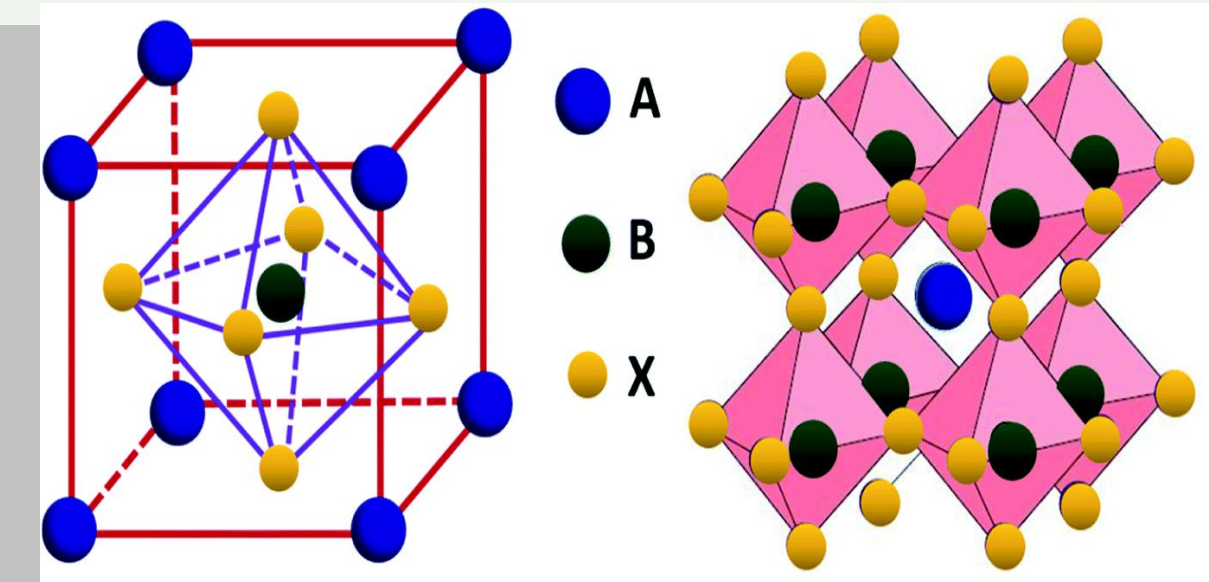
## Objectives & Impact of Professor's Research

In Professor Ravichandran's Lab, we are replacing silicon in electronics so as to find a sustainable alternative to fuel and powering electronics and solar cell. Additionally, this replacement material can increase the power and effectiveness of these cells. The smoother the surface, the brighter and more powerful the solar cells, which can bring lifetime supplies of energy to people in need.



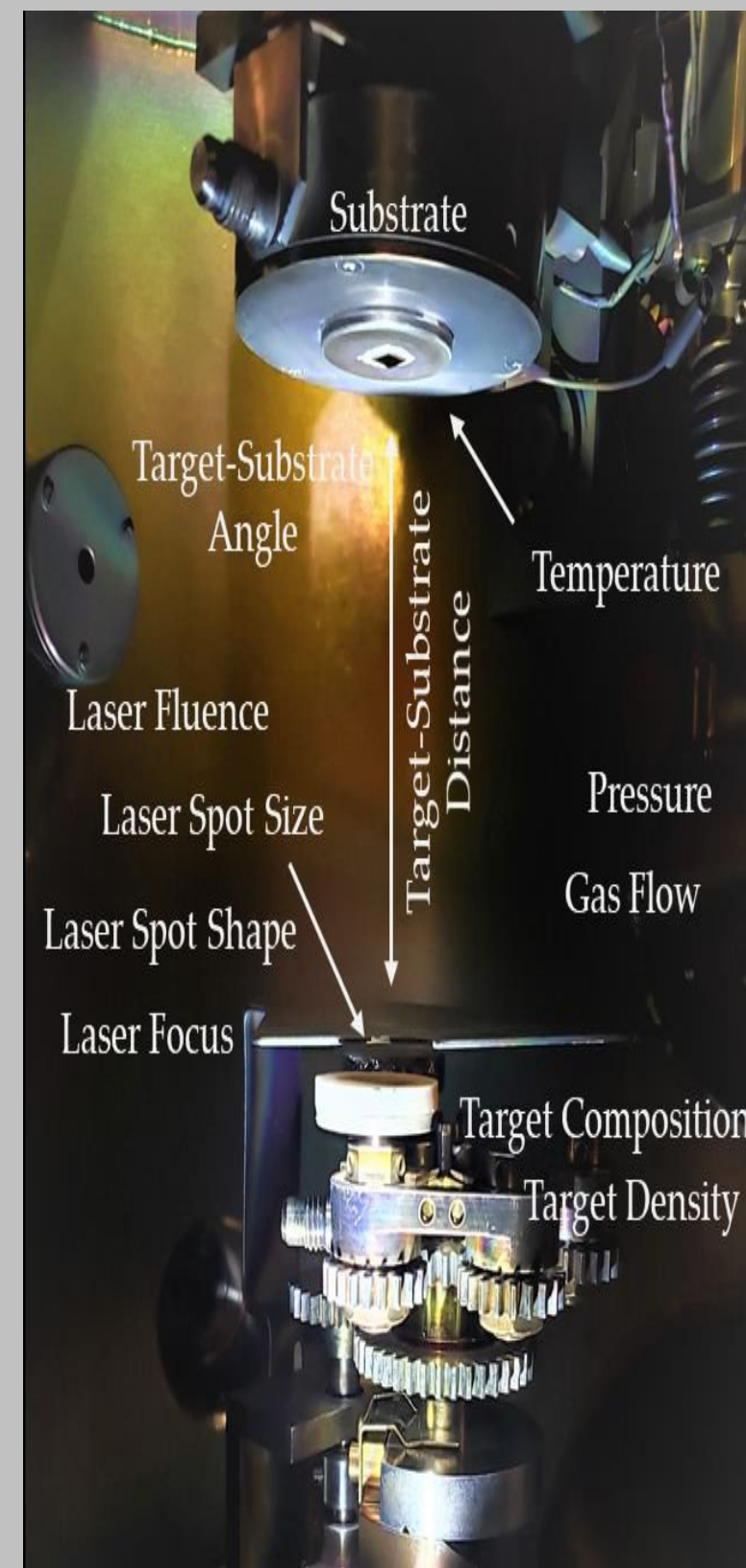
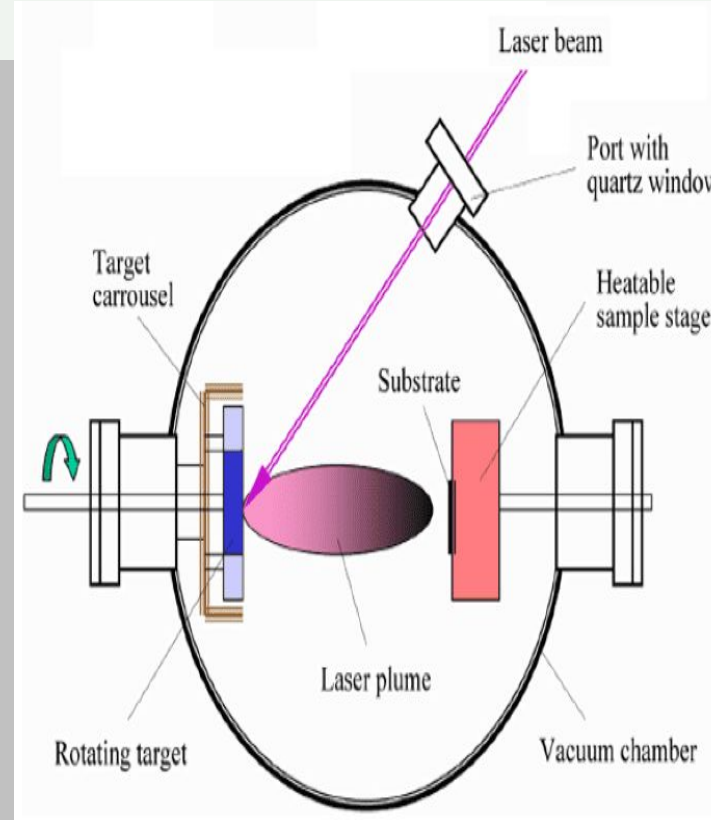
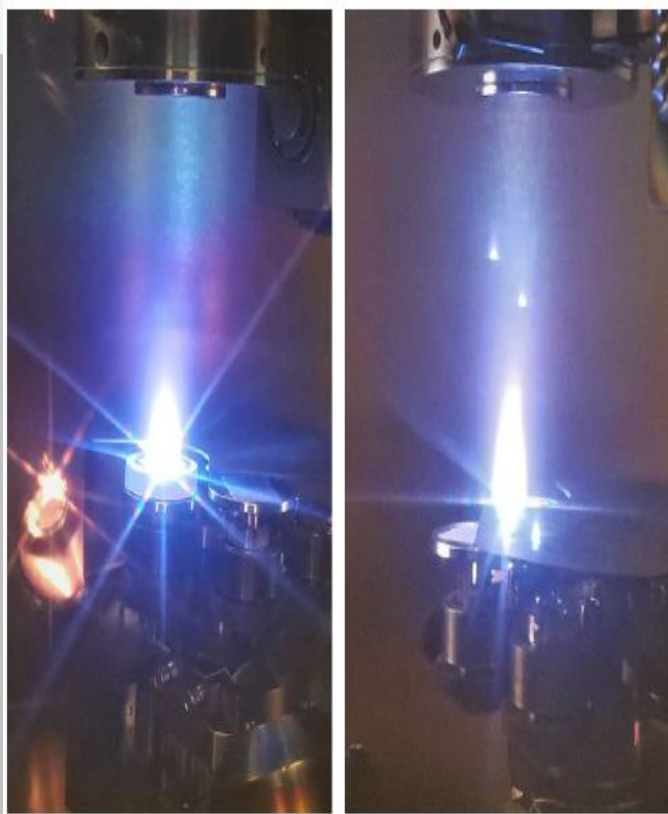
## How This Relates to My STEM Coursework

My love for math and science combines in this research lab. As I take in information it is important for me to relate it to my school coursework. Chemistry and interpretation of graphs are very prevalent as the lab showcases chemical compounds and their roles as materials. Additionally, SHINE utilized my knowledge of the functions of electrons.



## Skills Learned

As SHINE progressed and continued to throw me into new situations each one more unfamiliar than the last, I learned a variety of new skills and techniques to further my production and value as an engineer. These skills, ranging from application based - such as Matlab or learning Python for the very first time - to more conceptual learnings such as incorporating a growth mindset into my studies and understanding the values of failures and the opportunities that arise from them. More specifically, under the teachings of my SHINE mentor I've learned how a college level research team operates, as well as the cutting-edge technology that the team uses to produce innovative results. Also, I learned how electrons work and how the smoother a surface is, the more electrons that will reflect and the brighter the light will be.

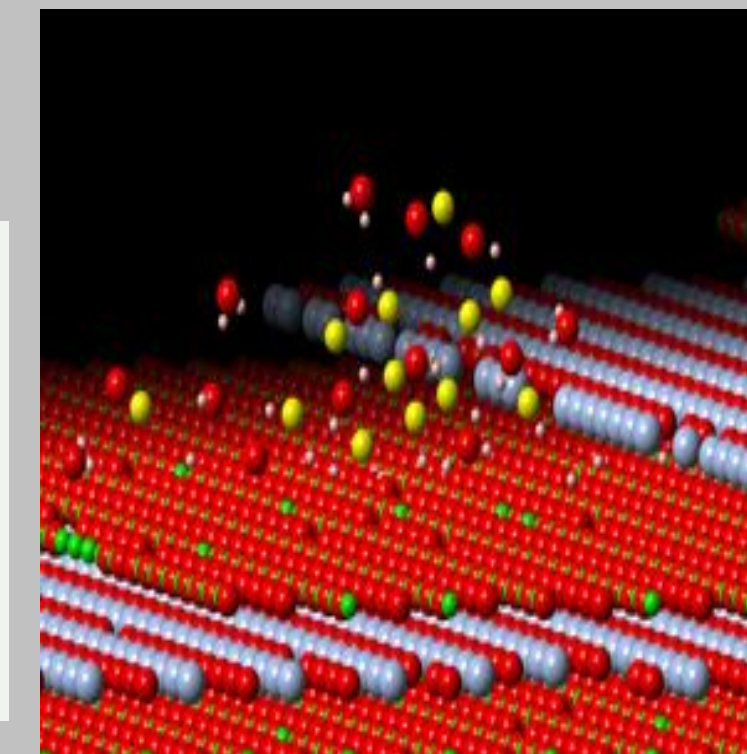


## Next Steps

### Advice for Future SHINE Students

Furthering my love for engineering, specifically in chemical and materials and pursuing it in a higher education such as college. I hope to continue my pursuit in this field in my higher academic career.

Advice I have for future Shine participants is to be vocal and participate in the program as everyone is there to help and support you.



## Acknowledgement

Thank you to Professor Ravichandran for giving me the opportunity to partake in a high-level research program. Thank you to my shine mentor Harish for guiding me and helping me understand the complex ideas. Also thank you to my Center Mentor Emily for her help in this process. Lastly thank you to Dr. Mills and Monica for creating a program that exceeded my expectations.