**Project 1: Searching H-alpha and [OIII] emitters using the JWST project**

I am extremely excited about this project because it deals with using the James Webb Space Telescope (JWST) to search for H-alpha and [OIII] emitters. The JWST is a powerful tool that will greatly enhance our understanding of the universe, and the opportunity to be involved in research that utilizes its capabilities is very appealing to me.

I am a good candidate for this project because of my strong background in computer science and my experience working with data. I am proficient in the needed skills for this including matplotlib, python, and statistics. I have been actively involved in various astronomical and data projects throughout my college career, and am confident that I have the programming skills to work with the data that the JWST will produce.

**Project 2: The formation of complex organic molecules via atom addition reactions**

The formation of complex organic molecules via atom addition reactions is a project that deeply interests me for several reasons. Firstly, the idea of creating complex molecules from simpler building blocks is fascinating to me, as it highlights the beauty and elegance of chemical reactions. The ability to create new compounds with specific properties and functions is incredibly powerful, and I am excited by the potential applications of this research, ranging from astronomy to the pharmaceutical and materials industries.

Additionally, I am drawn to the interdisciplinary nature of this project, as it combines my interests in chemistry, astronomy, and computer science. As a computer science student, I have experience in data science, which I believe will be valuable in this project. Specifically, I have a strong background in chemistry as I have been a teaching assistant for the Engineering Chemistry course and have a keen interest and undying interest in the subject. This project would allow me to apply these skills and knowledge to a cutting-edge research area.

**Project 3: Improving the Orbits of Substellar Companions project**

I am interested in this project as it deals with understanding the dynamics of exoplanetary systems, which is an area that I have always been fascinated by. The idea of studying the orbits of substellar companions and the potential to improve our understanding of their dynamics through advanced modeling techniques is incredibly exciting to me.

I am a good candidate for this project because of my strong background in computer science and mathematics. I have taken several courses in these areas, and possess the skills necessary to understand and contribute to the research being done in this project. I’m excited about the prospect that by studying the orbits of substellar companions, we can better understand the conditions that are necessary for a planet to be able to support life and potentially identify new candidates for future study. This could also have implications for our understanding of the likelihood of the existence of extraterrestrial life and the possibility of life beyond our planet.

I am keen to take this as I have long been interested in engineering and astronomy, working on it in instances like when I represented India at the APRSAF space conference and working with Indian Space Research Organization learning the fluid dynamics to build efficient water rocket models. Max Plank Institute gives me a great opportunity to gain more relevant skills in the field and I am eagerly waiting to work under and learn from its researchers at Heidelberg. This would also aid in my career goals of doing a Ph.D. and dreams of being a researcher by giving me experience and new skills.

Finally, a circumstance that I feel has been crucial to my experience in the STEM field is being an underrepresented minority in higher education. Starting college as a first-generation student, I realized many of my peers from different backgrounds already had extensive exposure to the STEM field by conducting research and having mentors that are well-established in STEM. However, this did not deter my passion for science. I kept up with research by reading journal articles on topics that interested me and listening to podcasts about science research. I continued to pursue this passion by conducting cancer research, becoming a Teaching Assistant, and mentoring incoming college students. I wish to continue this by becoming a professor after a Ph.D.

In conclusion, I am deeply interested in both projects and I believe I have the appropriate background, skills, and interests to be a strong candidate for these projects, and would be honored to have the opportunity to participate in these projects.