Dear Dr. Maximilian Hofmann,

I am writing to express my strong motivation and interest in the position of "Research Associate - Development of Electric Motors for Vehicle Applications" at the Fraunhofer Institute. My name is Zhengnan Ma, and I am a highly driven and passionate individual from Hangzhou, Zhejiang Province, China.

There are several compelling reasons why I am specifically interested in pursuing my PhD studies in Germany and, in particular, why I am applying to the Fraunhofer Institute for this position.

1. I possess relevant knowledge and experience in motor control systems with extensive expertise in debugging motor drives. Although I have yet to design a motor, my professional background and experience have provided me with a robust foundation that will facilitate rapid learning and mastery of the essential skills required for this project. I am confident in my ability to contribute effectively to the successful development of electric motors for vehicle applications.

2. My strong interest in scientific research and technical R&D drives my aspiration to be involved in cutting-edge projects that bridge theory and practical applications in the engineering field. The opportunity to apply the theories and technologies I have studied to real-world engineering problems brings me a great sense of accomplishment and motivates me to continuously push the boundaries of knowledge.

3. Germany's renowned commitment to technological excellence and rigorous scientific research greatly appeals to me. Throughout my professional career, I have had the privilege of working with exceptional German instruments, all of which have consistently demonstrated superior quality and reliability. The German emphasis on precision and attention to detail aligns with my own dedication to excellence and would provide an ideal environment in which to further my academic and professional goals.

4. I have a close friend who currently works at the Fraunhofer Institute, specifically in the IGB department. From her firsthand experience, she has emphasized the Institute's international and collaborative working environment, as well as the substantial support received in terms of advanced equipment and dedicated research personnel. Her insight has provided me with a deeper understanding of the Institute's values and work culture, reinforcing my desire to join the Fraunhofer community and contribute meaningfully to the team's endeavors.

In terms of my professional background, I have gained valuable experience through previous roles. My first employment was at VEICHI company, where I worked on the functional maintenance and development of servo drives, specializing in non-standard servo drive software development for applications such as electronic cams and tracking and flying shears. These technologies are extensively utilized in the cutting of metal and paper products.

Subsequently, I joined Mobo Robotics company as an embedded software engineer and servo drive engineer. In this role, I have focused on three closed-loop control of motors, including developing disturbance observer, speed observer, and vibration suppression algorithms. Additionally, I have provided support in the development and debugging of temperature sensors, vibration sensors, and capacitive displacement sensors.

Beyond my professional experience, I have also undertaken personal projects to further enhance my skills and knowledge in motor control systems. Notably, I have developed and maintained a motor control simulation project using C++. This endeavor serves as both a personal interest and a means to validate and address the challenges encountered in my studies and work. Furthermore, this project can be easily adapted and transferred to microcontrollers for practical implementation.

In conclusion, I am highly motivated and eager to contribute to the Fraunhofer Institute's important research on the development of electric motors for vehicle applications. By leveraging my relevant expertise, strong technical foundation, and passion for scientific research, I am confident in my ability to make valuable contributions to the Institute's ongoing projects. I would be honored to discuss my application further in an interview or provide any additional information you may require.

Thank you for considering my application. I look forward to the opportunity of hearing from you.

Sincerely,

Zhengnan Ma