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To Whom It May Concern,

I am writing this letter to share my background, motivations and aspirations to pursue a PhD in nanoscience and nanotechnology at Chalmers University of Technology. My academic journey in Electronics Engineering at the University of Pisa has been marked by a growing interest towards the quantum realm — particularly in the area of superconducting quantum computing. As I approach the completion of my MSc, I have come to realize that my passion for research, combined with my technical expertise and hands-on project experience, makes pursuing a PhD the natural next step in my career.

From the early days of my undergraduate studies, I was captivated by how the principles of electronics could be harnessed to probe and manipulate quantum phenomena. My BSc thesis, which focused on the “*Dispersive Readout of the Transmon Qubit*”, introduced me to the challenges and intricacies of quantum measurement techniques. Building on this foundation, my MSc project focuses on the design and implementation of a control and characterization system for a superconducting Transmon qubit. This endeavor not only requires a deep understanding of quantum mechanics and superconductivity but also demands the integration of cutting-edge embedded systems and advanced electronic design. Through this project, I have gained valuable experience with experimental techniques and quantum computing tools, reinforcing my commitment to advancing our understanding of qubit behavior at the nanoscale level.

My interest in nanoscience and nanotechnology stems from the belief that the control and manipulation of matter at the nanoscale hold the key to overcoming some of the most pressing challenges in quantum computing. The ability to fabricate and characterize nanostructured superconducting circuits is critical for achieving robust, high-coherence qubits that can serve as the backbone of future quantum computers. I have been following the groundbreaking research at WACQT at Chalmers and I am deeply inspired by your innovative approaches to improving qubit architectures and integrating quantum devices with state-of-the-art nanofabrication techniques. The work being conducted at your institution resonates with my research interests and my vision of a future where quantum technology revolutionizes computation and information processing.

In addition to my technical background, I have cultivated personal qualities that I be-

lieve are essential for success in a PhD program. My academic and professional experiences have instilled in me a strong sense of discipline, creativity and perseverance. As Chief Technology Officer for a student FSAE team, I led the electronics and AI divisions, coordinating complex projects and navigating challenges that demanded both analytical problem-solving and collaborative teamwork. These experiences have not only refined my technical abilities but have also taught me the value of leadership, clear communication, collaboration and resilience when faced with setbacks.

Looking forward, I am eager to explore new methodologies for enhancing qubit coherence and scalability through the interplay of nanofabrication, material science and advanced electronics. My interest stems from the profound impact I believe quantum computing will have across various scientific disciplines, such as atomic-scale simulations, much like classical computing has revolutionized scientific methodologies. Given the current state of the field, superconducting qubits represent one of the most promising approaches to realizing practical quantum computation, and I am keen to be part of the research efforts driving this progress. I am particularly interested in developing novel strategies for quantum error correction and noise reduction in superconducting circuits — a field where I believe my background in both theoretical principles and practical system design will be especially valuable. I am convinced that the dynamic and interdisciplinary research environment at Chalmers is the ideal setting for such endeavors. Working alongside leading experts at WACQT, I am excited by the prospect of contributing to projects that push the boundaries of what is currently achievable in quantum computing.

The decision to pursue a PhD is motivated by my desire to make a lasting impact on the field of quantum technology. I am driven by an insatiable curiosity and a commitment to advancing scientific knowledge and I see a PhD as the perfect avenue to delve deeper into research that has both fundamental and transformative implications. I am particularly drawn to the collaborative spirit and the emphasis on innovation that characterizes Chalmers University of Technology. I believe that being part of this vibrant academic community will not only nurture my research aspirations but also allow me to grow as a scientist and contribute meaningfully to the global effort to realize practical quantum computing systems.

In summary, my academic background in electronics engineering, hands-on experience with superconducting qubits and the insights gained from my MSc project have all fueled my passion for nanoscience and quantum technology. I am excited by the opportunity to join Chalmers and collaborate with researchers at WACQT to address the formidable challenges of quantum device scalability and performance. I am confident that my technical skills, combined with my determination, leadership and innovative mindset, will enable me to contribute effectively to your research initiatives.

Thank you for considering my application. I look forward to the possibility of discussing my research interests and future contributions in greater detail.

Yours Faithfully,

Leonardo Bove