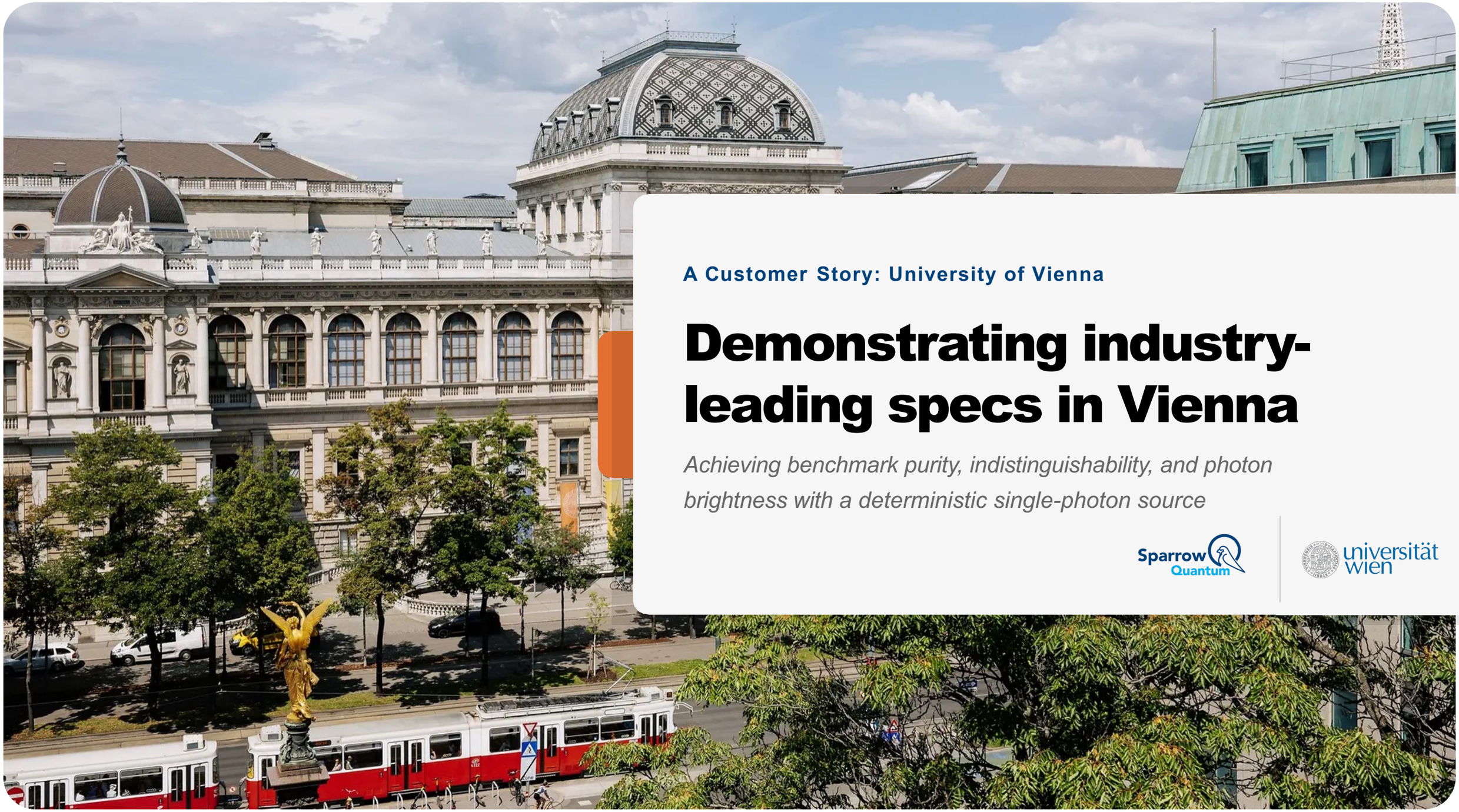

A Customer Story: University of Vienna

Demonstrating industry-leading specs in Vienna

Achieving benchmark purity, indistinguishability, and photon brightness with a deterministic single-photon source

Sparrow Quantum

universität wien

Demonstrating industry-leading specs in Vienna

Achieving benchmark purity, indistinguishability, and brightness with a deterministic single-photon source

Recently, Sparrow Quantum delivered a deterministic single-photon source to Professor Philip Walther's renowned research group at the University of Vienna, surpassing expectations and significantly enhancing the Walther Group's research capabilities.

The Walther Group is one of the leading research teams in photonic quantum technology. As a research group specializing in fundamental research and experimental investigations in quantum science, as well as the development of advanced photonic quantum technology for applications in quantum information processing, a high-quality source of single photons is invaluable to the Walther Group's research technology.

In light of their hands-on experience using a variety of photonic instruments and technologies, as well as the difficulties they encountered when utilizing a single-photon source from another supplier, the Walther Group decided to explore Sparrow Quantum's technology. Sparrow Quantum is recognized as a key player in this domain, specializing in providing advanced single-photon components.

Sparrow Quantum's flagship product is a deterministic single-photon source delivered as an integrated photonic chip. The chip is sectioned into an array of structures engineered to emit highly coherent single photons at wavelengths ranging from 920nm to 980nm.

Performance Excellence at Installation

The single-photon source chip from Sparrow Quantum offers industry-leading specifications, and the source installed in the Walther Group's lab met all specs shortly after the two-day installation process, resulting in the following performance:

Photon indistinguishability	> 95%
Purity, $g^{(2)}(0)$	< 2%
Photon efficiency into single-mode (brightness)	> 31%
Photon count rate on detector *	> 20M cts/s

* Using an 80MHz pulsed laser and having a full setup efficiency of 26.5%

The high-quality performance of the source significantly improved the group's research efficiency. After the 48-hour installation process was concluded, the source was already used to explore complex quantum phenomena with greater ease and precision. As Dr. Juan Loredo, Senior Scientist in the Walther Group, highlights:

> *"Using Sparrow's source, we've implemented a multiphoton experiment in a short time upon installation for effectively purifying errors inherent to solid-state photon sources. With these findings, we expect to provide novel ways for achieving higher quality and fidelity in real-world implementations of quantum photonic experiments."*

Furthermore, the research group foresees readily attainable performance enhancements as their setup has not yet been fully optimized.

> *"Sparrow Quantum's technology has not only met but exceeded my expectations. The immediate availability of desired parameters, exceptional stability, and unmatched result reproducibility have profoundly impacted our research. I wholeheartedly recommend their products to anyone in the quantum technology field".*

– Dr. Juan Loredo

Senior Scientist at the Walther Group

Unique Design Delivers Multifaceted Benefits

In addition to meeting high-performance specifications, Sparrow Quantum's source brought additional key benefits to the Walther Group, thanks to its unique design:

- **Spatial Filtering**: The planar design simplifies optical alignment by enabling spatial filtering of the pump laser.
- **Stability**: The quantum dot remains stable for several months of operation, eliminating the need for frequent optical realignment.
- **Robustness**: Even after thermal cycling, minimal re-alignment is required, and the performance remains consistent.

Furthermore, the research group appreciated the quantum dot's resilience to noise, maintaining a stable and tuneable electric field across the photonic crystal.

This starkly contrasts their previous experiments with another commercially available single-photon source, where wavelength tuning was needed for continuous quantum dot activation after temperature cycling.

Expert Insights and Recommendation

Drawing from their extensive experience in the field, the Walther Group highly recommends Sparrow Quantum's single-photon source. They emphasize its user-friendliness, exceptional performance, and the unique advantages of its design. The group also highlights the exceptional support and customer care provided by the Sparrow team.

Sparrow Quantum deeply appreciates the invaluable insights and experiences shared by the Walther Group and eagerly anticipates future collaborations and experiments made possible by the Walther Group's use of Sparrow Quantum's technology.

Sparrow Quantum

Want to learn more about Sparrow Quantum's industry-leading deterministic single-photon source?

Contact us

Sparrow Quantum is a Danish quantum technology company dedicated to advancing light-matter interfaces for quantum technologies. The company is widely recognized as a leader in single-photon sources, demonstrating the world's highest light-matter coupling efficiency. The unparalleled technology of Sparrow Quantum offers researchers and developers of quantum technology systems access to essential building blocks for scaling up advanced quantum technology applications in information processing and communication. Application areas include secure quantum communication, photonic quantum computing, and quantum repeaters for the quantum internet. Sparrow Quantum's technology results from over two decades of pioneering research by founder Prof. Peter Lodahl and his Quantum Photonics Group, which is part of the Center for Hybrid Quantum Networks (Hy-Q) at the prestigious Niels Bohr Institute (NBI) in Copenhagen, Denmark.

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