

# Beyond the Quantum Visible: Design Pathways Across Research, Art, and Scientific Communication

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**Abstract:** Design serves as a transdisciplinary method to make quantum mechanics accessible, translating superposition and entanglement into visual, spatial, and multisensory experiences.

Design for scientific communication has emerged as a strategic tool for engaging diverse audiences – particularly younger generations – with the complex themes of contemporary physics. It does not operate as a superficial aesthetic intervention; rather, it is grounded in a rigorous and structured design methodology that integrates audience analysis, the definition of shared communication goals, and continuous iterations between scientists and designers [1]. The role of design is especially strategic in frontier sciences and in quantum mechanics, a discipline that still lacks an accessible visual and cognitive framework for the general public. In this context, design acts as a transdisciplinary method capable of translating abstract concepts such as superposition and entanglement into accessible spatial, visual, and multisensory experiences, integrating science, design, and art [2].

The contribution presents case studies of exhibition design dedicated to quantum physics and its emerging technologies, including Quantum Nexus (Città della Scienza, Naples, 2025), The Quantum Effect (Venice, 2025), and artworks such as *Quantum Cloud* and *Il Codice del Vuoto*. These projects explore innovative narrative strategies, including modular content structures, visual metaphors drawn from cinema and contemporary art, immersive environments, physical and digital interactivity, and multisensory approaches.

The transdisciplinary approach [3] facilitates authentic dialogue among scientists, artists, and the public, fostering shared representations of a field that lacks consolidated communicative codes. The aim is to outline new expressive directions for STEAM scenarios [4], transforming exhibition experimentation into a laboratory for cultural translation at the quantum frontier.

## References

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