

Rizhao Science and Technology Museum Rizhao, Shandong Province. 2014-2020

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Abstract: The Rizhao Science and Technology Museum is conceived as a civic institution dedicated to the public transmission of scientific knowledge, operating at the intersection of research, education and urban life. Originating from an initiative linked to the scientific legacy of Nobel laureate Samuel Chao Chung Ting, the project moves beyond a commemorative model to define a cultural infrastructure aimed at engaging a non-specialised audience with contemporary science. Embedded within a coastal park between the city and the Yellow Sea, the museum is largely developed underground to preserve landscape continuity while organising a complex spatial sequence beneath it. A continuous spiral path guides visitors through a progression of exhibition spaces that translate abstract scientific concepts into an embodied experience. Circulation, structure and geometry operate as a single cognitive device, framing architecture not as a neutral container but as an active mediator between scientific content and public understanding. The project exemplifies an architectural approach in which institutional permanence and experiential engagement coexist, positioning architecture as an infrastructure of knowledge within the contemporary city.

Keywords: *Science museum, Civic infrastructure, Museum and landscape.*

The Rizhao Science and Technology Museum is conceived as a public institution dedicated to the transmission of scientific knowledge, bridging academic research and a broad, non-specialised audience. The project originates from the figure of Professor Samuel Chao Chung Ting (Ding Zhaozhong), Nobel Laureate in Physics (1976) for the discovery of the J/ψ particle, whose long-standing scientific career has unfolded primarily in international research centres, notably at CERN in Geneva. When the Municipality of Rizhao proposed the construction of a museum initially dedicated to his work, Professor Ting actively supported the initiative, contributing to the definition of the exhibition content, the selection of scientific equipment and the overall educational strategy.

During the early conceptual phase, the project's scope was deliberately

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expanded and the institution renamed Rizhao Science and Technology Museum. This decision marked a shift from a celebratory monographic approach to a broader cultural ambition: the museum was intended as a platform for popular science, capable of addressing students, families and non-specialist visitors while maintaining a rigorous connection with contemporary scientific research. In this sense, the museum was conceived not merely as a container for exhibits, but as a civic infrastructure aimed at strengthening the relationship between scientific knowledge and society. The selected site lies on the western edge of the Olympic Water Park, a large coastal park mediating between the urban fabric of Rizhao and the seascape of the Yellow Sea. The decision to locate the museum closer to the waterfront rather than within the dense urban context reinforces its role as an interface between the built city and the natural environment. From the site, elevated viewpoints offer panoramic views encompassing water, greenery, urban towers and the open sea. This condition informed a key design objective: the museum is conceived to guide visitors through a spatial sequence connecting natural and artificial realms, framing scientific exploration as a human endeavour embedded within the larger environmental context.

In response to the sensitivity of the park landscape and the proximity of the Botanical Garden, the architectural mass was largely embedded underground. Of the approximately 19,600 square metres of total floor area, most exhibition spaces are located below ground, covered by a green roof that restores continuity with the park surface. Only a limited portion of the building emerges above ground, signalling the museum's presence while minimising its visual impact on the surrounding landscape.

The masterplan is organised around a circular core, generating a dynamic spiral layout that distributes the main functional elements: entrance and exit lobbies, five large exhibition halls with their satellite rooms, a congress hall and service areas. All spaces are subjected to a rotational geometry centred on the core, evoking the frozen motion of a particle accelerator. This spatial strategy recalls the conceptual lineage of the "endless museum" proposed by Le Corbusier, while reinterpreting it through a contemporary and explicitly scientific metaphor.²

The visitor's journey is conceived as an experiential narrative. From the entrance at ground level, access is immediately directed downward

2. ALLEN 2000, pp. 1-15; 47-62.

into a dimly lit underground space, likened to a cave exploration. The circulation path unfolds as a continuous loop around a central void – symbolically associated with an astral black hole – connecting the exhibition halls located at – 6m from entrance level. Possible re-wording: "connecting the exhibition halls at basement level, dedicated to the investigation of matter, and ascending through a circular ramp toward daylight and open sky, representing nature and the universe. The sequence culminates at an elevated outdoor platform, from which visitors enjoy a 360-degree view of the landscape before descending along an external ramp back to the main atrium.

The above-ground architectural element consists of a helicoidal ramp winding around a concrete core, rising approximately 15 metres above the green roof. This structure functions both as a circulation device and as a public belvedere, reinforcing the museum's role as an urban and landscape landmark rather than a closed institutional object.

The five main underground exhibition halls house large-scale scientific equipment and models reproducing the most significant experimental setups developed by Professor Ting, including particle accelerators. Each hall is dimensioned according to the size of the equipment on exhibit and enclosed by a sequence of cast-in-place concrete vaults with progressively decreasing arches. The vaults, realised without surface finishing, integrate voids for electromechanical systems and contribute to an immersive spatial atmosphere. The fair-faced concrete surfaces deliberately recall the materiality of excavation tunnels, reinforcing the association between scientific research and spatial exploration.

The construction of the complex curved vaults represented one of the main technical challenges of the project. Through the use of advanced BIM modelling, the geometry of each formwork element was precisely defined, fabricated and assembled on site. Curved structural concrete elements recur throughout the underground levels, shaping not only the exhibition halls but also satellite rooms, circular corridors and the entrance lobby, which is covered by concentric vaults supported by wide arches. Carefully designed lighting systems enhance the spatial continuity and guide the visitor's perception.³

At the centre of the building, a large truncated concrete cone defines the main spatial and symbolic focus. The upper level houses a circular

3. PICON 2010, pp. 22-35.

projection theatre with a hemispherical dome, while the lower level accommodates a central hall representing astrophysical phenomena related to Professor Ting's research. The exterior surface of the cone, clad in highly reflective corrugated aluminium panels, supports the roof structure and the suspended helicoidal ramp. The structural system separates the load-bearing concrete core from the lighter steel elements, allowing a reduction in material thickness and visual weight.

The geometry of the above-ground elements evolves into an octagonal form aligned with the roof outline. This transformation carries a symbolic reference to the Large Hadron Collider at CERN, one of the most significant scientific instruments associated with Professor Ting's work. From a distance, the museum appears as a light, permeable object composed of reflective metal surfaces, cables and inclined planes – an image deliberately contrasting with the surrounding urban fabric. At night, a dynamic lighting system enhances the building's presence, reinforcing its identity as a public attractor.

Beyond its architectural and technical achievements – recognised by international awards for lighting design and computational modelling – the Rizhao Science and Technology Museum operates as a catalyst for public life. Conceived as an open civic centre, it hosts exhibitions, workshops, educational programmes and public events, fostering engagement with science across different age groups and social backgrounds. In this sense, the museum exemplifies an architectural approach in which institutional stability and public accessibility are held in productive tension, positioning architecture as an active mediator between knowledge and society.

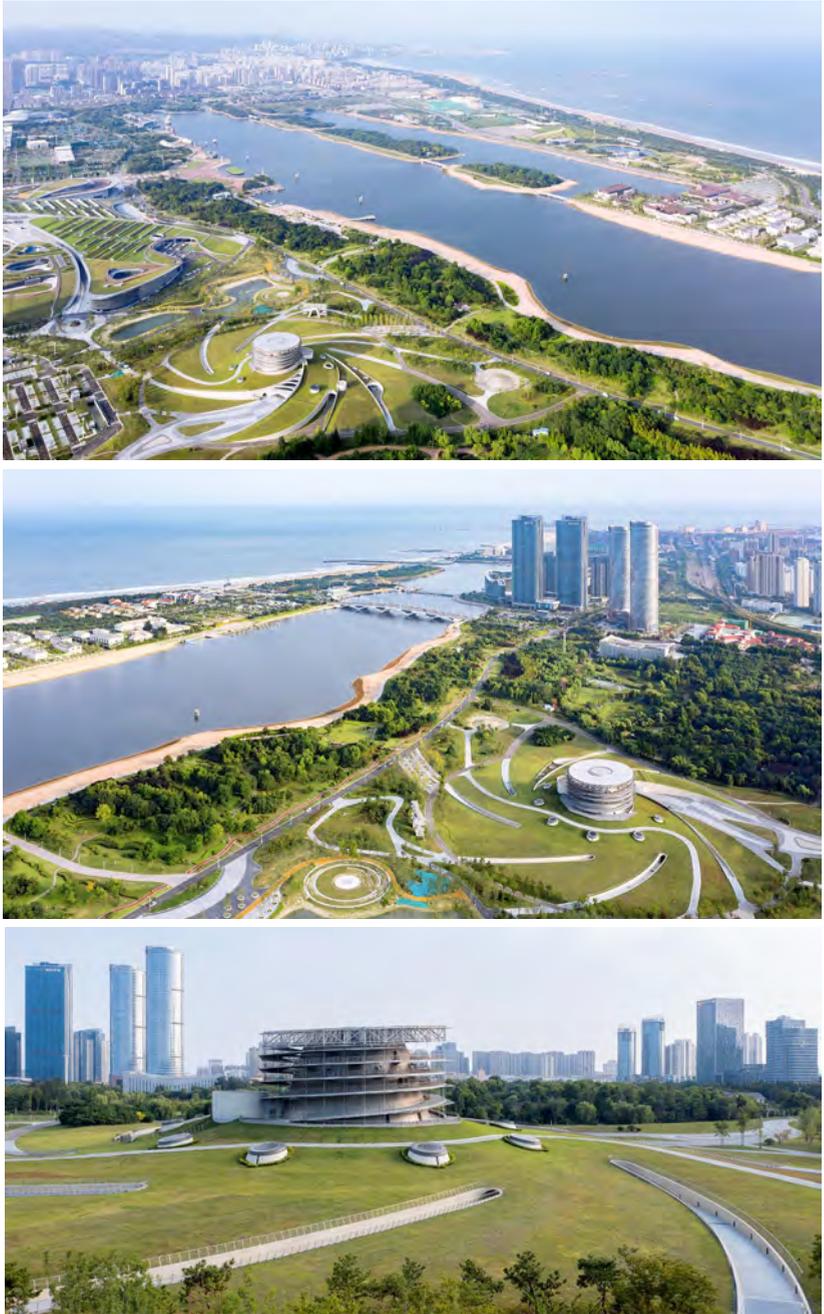
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ALLEN 2000

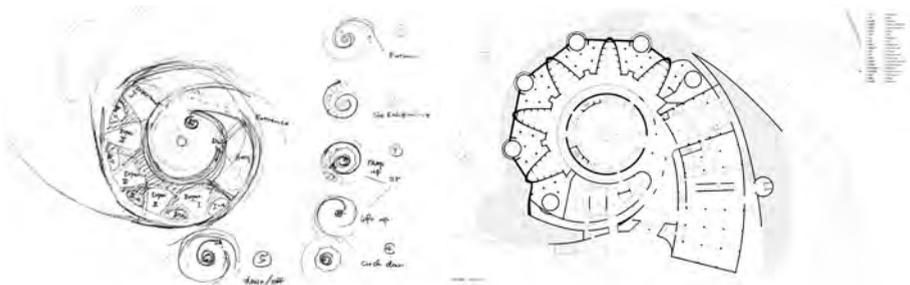
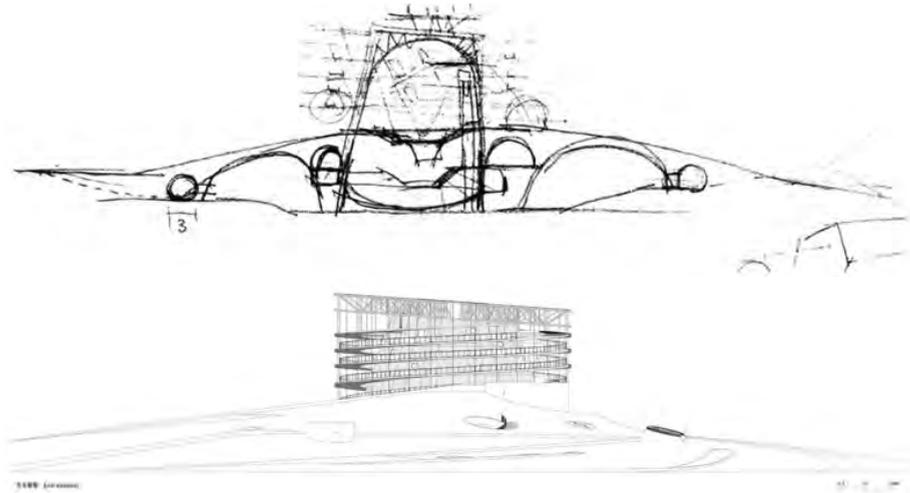
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PICON 2010

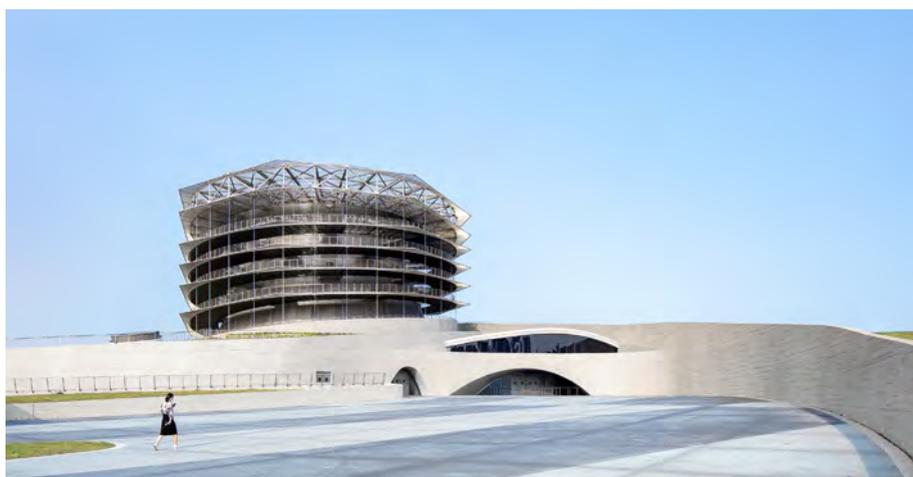
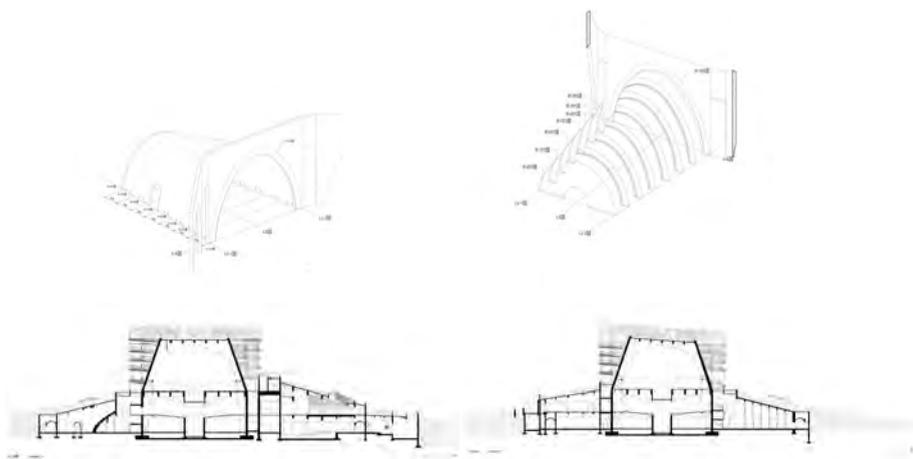
Antoine Picon, *Digital Culture in Architecture*, Birkhäuser, 2010, pp. 22-35.



*Rizhao Science and Technology Museum, Rizhao, Shandong Province. 2014-2020.
Fig. 2-4. Overview towards North, towards South, Museum within the City landscape and skyline.*



Rizhao Science and Technology Museum, Rizhao, Shandong Province. 2014-2020.
Fig. 5-15. Sketches, elevation, plans, sections, diagrams, renderings, model views, views.



建筑 - 结构专业 - 展览区模型





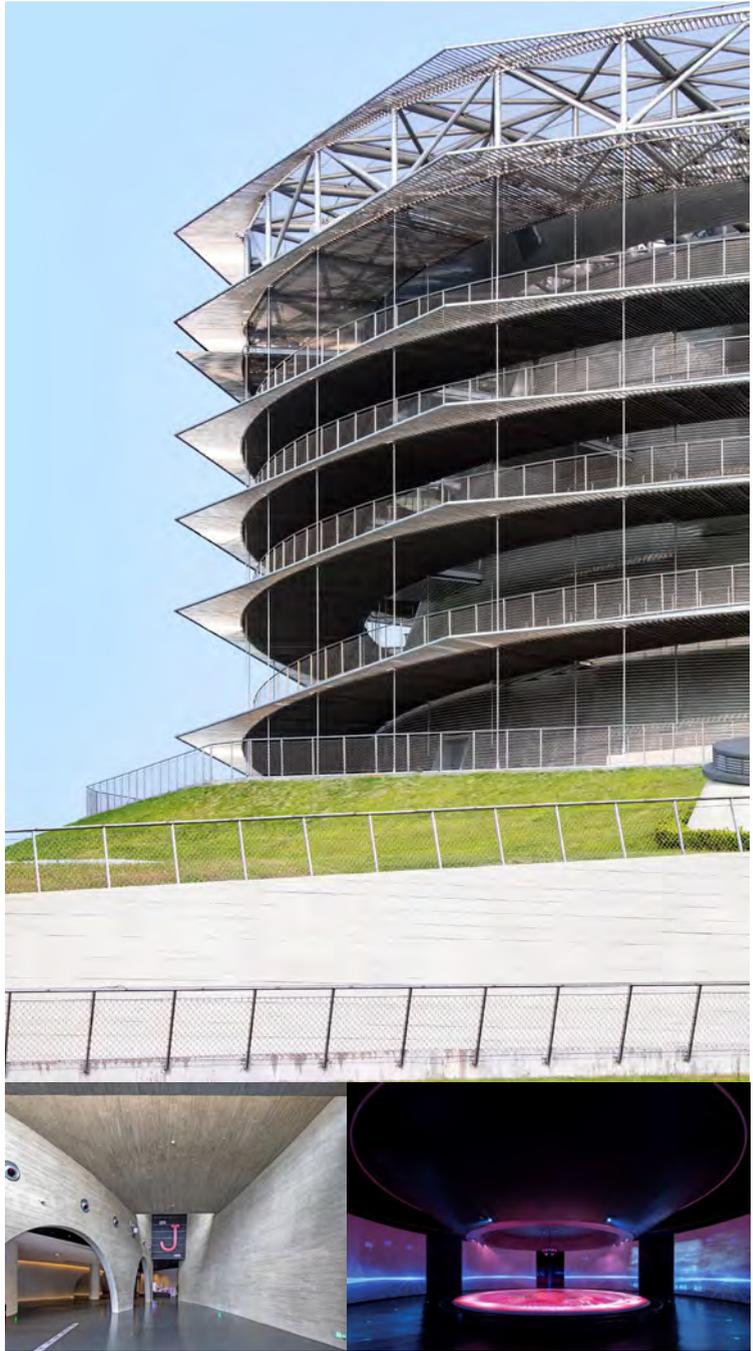
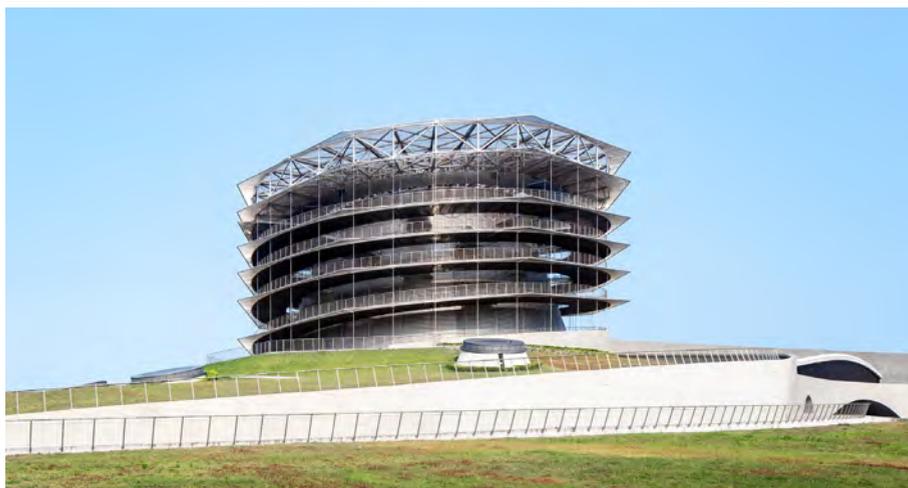
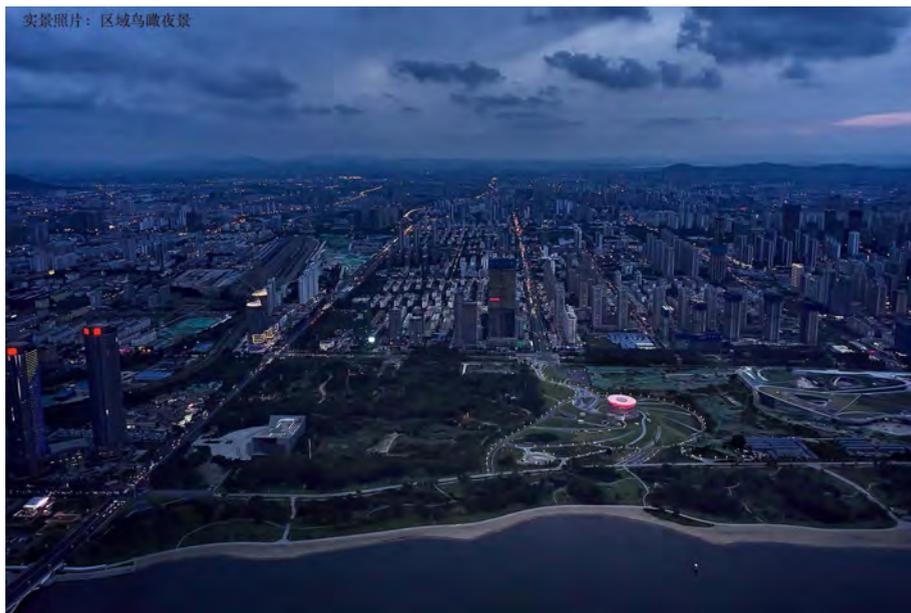


Fig. 16-23. Exterior and Interior views.



*Rizhao Science and Technology Museum, Rizhao, Shandong Province. 2014-2020.
Fig. 24-27. Exterior views and contextual impact.*





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Fig. 1. South Classroom volumes*