One of the project's steel stairs is installed within the exhibition space.

FACT FILE
Spectra building, University of Hertfordshire, Hatfield
Main Client: **University of Hertfordshire**
Architect: **ADP Architecture**
Main contractor: **Morgan Sindall**
Structural engineer: **AECOM**
Steelwork contractor: **Elland Steel Structures**
Steel tonnage: **1,200t**

Steel passes the test for science block

Providing a quick delivery and minimal internal columns, structural steelwork was the chosen framing solution for the University of Hertfordshire's largest development to date.

Set to open this month (September), the University of Hertfordshire's new, multi-million-pound home for its School of Physics, Engineering and Computer Science is largest-ever development on the Hatfield campus and forms the first phase of a wide-ranging vision.

Known as Spectra, the steel-framed structure will be a hub for teaching, research, and innovation, and give students and staff valuable space to collaborate and socialise, enhancing the sense of community within the school.

The University says state-of-the-art equipment and labs will help to inspire and develop the next generation of engineers, computer scientists, mathematicians and physicists.

Aiming to achieve a BREEAM 'Excellent' rating, the landmark science building brings together state-of-the-art labs and research technologies to transform the learning, teaching and research experience within the field of STEM (Science, Technology, Engineering, and Mathematics) for students, researchers and staff.

Professor Quintin McKellar, the University's Vice-Chancellor, says: "It's vital that not just our fantastic teaching, but also our campuses and facilities, offer our students the best learning experience. In Spectra, we are providing a remarkable space in which our students and staff will thrive, and this exciting new development will play a key role in the future of the university."

Located on a centrally-positioned plot within the campus, main contractor Morgan Sindall completed the enabling works in October 2021, with the build programme kicking off a month later.

According to Morgan Sindall, the main reasons a steel framed solution was chosen was to ensure speed of construction on site, while the material also helped to enhance the quality control of prefabricated columns, beams, and connection plates.

The majority of the steel columns and beams are exposed with finished intumescent coating. This has helped create the desired modern industrial-looking interior of the building. However, in some spaces, a selection of columns and beams are encased to provide the required fire protection and acoustic performance.

The five-storey building accommodates laboratory and teaching spaces on all floors and these are divided by a central atrium and an exhibition space located along one elevation. Together, these two areas form a T-shaped full-height open area in the heart of the building.

The laboratory and teaching spaces are large open-plan areas, a feature that was also best created with a steel frame. These spaces form a vital part of the structure as each floor will include an array of different environments.

They include modelling, simulation and research labs, flight simulators, an automotive workshop complete with electric vehicle facility, a wind tunnel, welding bay and controls testing suite. Students will have access to state-of-the-art cyber security laboratories while the upper floors provide space for workshops, research and computer science, as well as social and meeting spaces to

collaborate and socialise.

Alongside these facilities, the computer science labs will accommodate space for telecommunications, robotics and human-robot interaction. The research spaces will include dark rooms, clean rooms, sample prep labs, calibration and assembly labs, all designed to support a range of disciplines such as astrophysics, atmospheric and climate physics and biodetection technologies.

Housing this impressive list, the main building is based around a regular 9m × 9m column grid pattern. However, longer spans, utilising 18m-long roof beams, have been formed within the full-height exhibition space, where one line of internal columns have been omitted.

Flexibility is at the heart of the project's design, and furniture in the large rooms and spaces can be reconfigured as needed to create different seating arrangements or accommodate specific activities. The 9m x 9m grid pattern also allows for internal wall partitions to be reconfigured in the future, creating larger spaces if required.

Two concrete cores, located at either end of the building provide some of the stability to the main frame, while throughout the structure, steel beams support metal decking and a concrete topping to create a composite flooring solution.

The design team chose to use metal decking as it acts in composite action with the concrete slab, functioning as a diaphragm to distribute lateral loads. This reduces the lateral load demands on the cores and shear wall elements. Alongside these physical benefits, using a metal decked floor solution also boosted the project's speed of construction.

As part of its steelwork erection programme, which was undertaken with one 65t-capacity mobile crane, Elland Steel Structures installed 14,000m² of metal decking for the project, as well as four steel stairs. One is positioned within the atrium, while the other three stairs provide access to the upper floors and are located alongside the exhibition space's glazed façade.

The glazed façade is supported by some architectural steelwork, consisting of stainless steel hangars and box sections, all of which, along with the stairs, can be seen through the glass.

The roof of the Spectra building has also been compositely formed and it accommodates a plant area. This has been erected using fully-galvanized sections, consisting of 4m-high columns, with a spliced connection to the structure's main perimeter members, and horizontally-positioned beams.

Summing up, Emma Curtis, Area Director at Morgan Sindall Construction in the Northern Home Counties, says: "Handing over the keys for the new School of Physics, Engineering and Computer Science was an exciting moment, as this facility will significantly boost much needed STEM skills while creating a vital hub for advanced research and academic innovation.

"Having a close, collaborative working relationship with the University of Hertfordshire and taking an innovative, Intelligent Solutions-led approach to the project was vital to ensure the completed Spectra building equips the University's researchers and future experts with the capabilities they need." ■

The steel frame is based around a regular and efficient 9m x 9m column grid pattern.

"Having a close, collaborative working relationship with the University of Hertfordshire and taking an innovative, Intelligent Solutions-led approach to the project was vital to ensure the completed Spectra building equips the University's researchers and future experts with the capabilities they need."

Finishing touches are applied to the façades in readiness for this month's opening.

Two cores, positioned at either end of the building, provide stability to the steel frame.