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Queen's University Belfast plays leading role in world's biggest solar telescope

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Queen's University Belfast and Belfast business Andor Technology are playing a leading role in the construction of the world's biggest and most revolutionary solar telescope.

Queen's University is leading a consortium of eight UK universities and associated businesses to build the cameras for the $344 million super-telescope, which will be situated in Hawaii.

The Daniel K Inouye Solar Telescope (DKIST), which will be launched in 2019, is being constructed by the US National Solar Observatory on Haleakala mountain in Maui, Hawaii. With a four-metre diameter primary mirror, the telescope will be able to pick up unprecedented detail on the surface of the Sun - the equivalent of being able to examine a £1 coin from 100 kms away.

It is hoped that DKIST will address fundamental questions at the core of contemporary solar physics. It will do this via high-speed (sub-second timescales) spectroscopic and magnetic measurements of the solar photosphere, chromosphere and corona. DKIST is funded by the US National Science Foundation with £2.5m of funding provided by the Science and Technology Facilities Council.

Professor Mihalis Mathioudakis of the Astrophysics Research Centre at Queen's University Belfast, Principal Investigator of the UK consortium, said: "The Sun is the most important astronomical object for humankind with solar activity driving space weather and having profound effects on global climate and technology-based communications. To understand solar activity we need to observe and model the physical processes in the solar atmosphere on their intrinsic spatial and temporal scales so that, among other questions, we can reliably forecast this activity in space.

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Professor Mihalis Mathioudakis of Queen's University Belfast talks about the impact of

Queen's leading the UK consortium responsible for building the cameras on the DKIST telescope which will be the world's largest solar telescope when it achieves …more

"Scientific discoveries demand technological innovation and play a major role in economic growth. DKIST will be a revolutionary instrument for ground-based solar physics, which is a growth area in the UK. It will be in a position to explore key questions regarding solar magnetic field generation and dissipation, solar variability, atmospheric structure and dynamics. Our consortium will deliver key equipment that will allow DKIST to achieve these scientific goals and it's another example of how Queen's research impacts on society, both locally and internationally."

DKIST Director, Dr Thomas Rimmele said: "We are excited to have the UK consortium on board as partners. DKIST will be the world's most powerful solar telescope. The scientific and technological expertise represented by the Queen's University Belfast-led consortium is a great asset to the project."

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Professor Mihalis Mathioudakis talks about the involvement of Queen's University Belfast in building the cameras for the DKIST telescope which will be the biggest solar telescope on Earth when it achieves first light in Hawaii in 2019. Credit: Queen's University Belfast

Dr Donal Denvir, Technical Director at Andor Technology, said: "Andor will play a central role in the design and manufacture of state-of-the-art detectors for this high-profile, solar-physics initiative. The technology will provide an innovative combination of high-performance specifications that simply do not exist today, a solution that will prove enabling not only for next-generation solar studies, but for the wider professional astronomy community and beyond."

The consortium of UK institutes in DKIST is led by Queen's University Belfast and includes Armagh Observatory, Northumbria University, University College London, and the Universities of Glasgow, Sheffield, St. Andrews and Warwick. The consortium will partner with Belfast company and Queen's University spinout Andor Technology and the Science and Technology Facilities Council. The consortium will oversee the development and delivery of the cameras, and take the lead in supporting the UK solar physics community in their use of DKIST by providing a set of processing tools for DKIST data, synthetic observations to validate diagnostic approaches, and support for developing observing proposals.

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