

# A Dome Show for the CTA: Exploring the High Energy Universe



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## Abstract

Planetaria software systems have been improved significantly in the last decade thanks to technological developments. Today planetaria that use high-end dome software can produce entertaining, exciting, and informative 3D STEAM shows with very small budgets. This is the beginning of a new era for planetarium outreach.

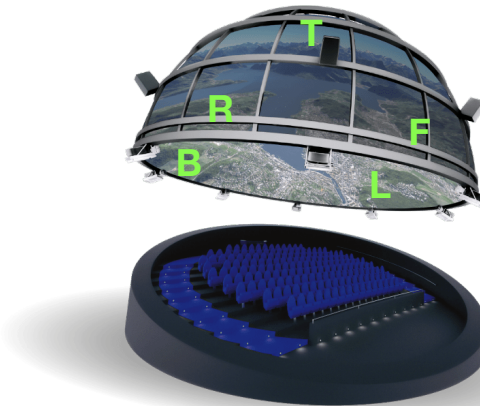
Armagh Observatory and Planetarium (AOP) has completed its first in-house full dome show production. The dome show let the audience travel in the universe, and see sources of gamma-rays. The show also introduces how CTA will operate and the importance of the project.

## Armagh Observatory and Planetarium



The Armagh Observatory and Planetarium (AOP) contains one of the world's oldest observatories *and* planetariums. Founded in 1790, the Observatory has been in continuous use for scientific research ever since. Six generations of telescopes are found within, still *in situ*, largely as they were when used for pioneering science in their day. Key innovations in the development of the modern clock-driven equatorial telescope through the 18<sup>th</sup> and 19<sup>th</sup> centuries can be experienced in a tour of the Observatory. Today, these telescopes sit alongside the research offices of the current astronomers, in what were formerly the living quarters of past Directors and their families. Only the astronomers are now conducting their research using the range of international facilities available to the 21<sup>st</sup>-century scientific community, and not those on-site in Armagh.

The Armagh Planetarium was opened in 1968, and today is the oldest operating planetarium in the British Isles. Only a handful of planetaria elsewhere in the world are older. In turn, it also has a significant history in its field having developed a reputation for innovation within the planetarium industry, for instance in the introduction of video technology into dome shows. Today, it attracts around 50,000 visitors per year (pre-Covid), a remarkably high number given that the population of the City of Armagh is just ~ 15, 000 people.



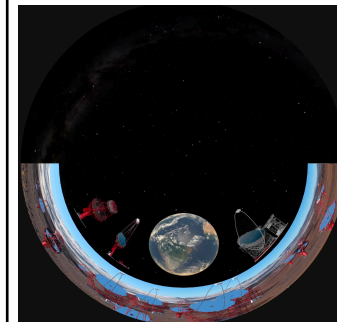
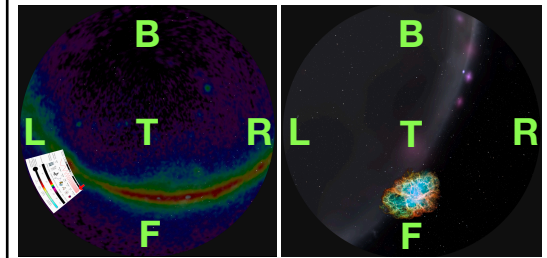
Full dome shows are unique experiences. It looks like a movie theatre but instead of having a flat screen in front, everywhere the audience look is the screen. Thanks to its 360-degree coverage and curvature audience also experience 3D effect without using any special glasses.



A photo from the AOP showing the excited students. Planetaria is not only important for outreach but also education. Children learn whilst getting entertained in planetaria. Thanks to technological developments planetaria systems become much more realistic. Thus the popularity of planetaria rises significantly among students and families.

## Exploring the High Energy Universe

AOP has completed its first in-house, ten minutes long, full-dome show. The show takes the audience on a space journey to show gamma-ray sources. Then it introduces the world's leading observatories and telescopes. The show ends with the exciting introduction of the CTA.



R: Right  
 L: Left  
 F: Front  
 B: Back  
 T: Top

It's quite hard to imagine a 360-degree full-dome frame on a 2D flat screen. These frames are taken from three different scenes of the show.

We use Digistar planetarium software at the AOP. Today, all the high-end planetaria software like Digistar can produce entertaining and exciting full-dome shows with high-quality animations. In this new era, it is really easy to produce unlimited STEAM shows for students from all age groups. Also, graduate-level education can be supported as planetaria are great tools for data visualisation.

"Exploring the High Energy Universe" will be freely available to all the planetaria around the globe.