# Dark matter at Chelsea

**Mike Bode** and **Andy Newsam** describe the path to Chelsea Flower Show success for the National Schools' Observatory's Dark Matter Garden.

The Royal Horticultural Society's annual Chelsea Flower Show in May is the top of the tree for garden enthusiasts – a huge and prestigious show where professional garden designers show off their skills and thousands of keen amateurs visit to admire their work. The National Schools' Observatory's "Dark Matter" garden not only won a gold medal this year, but also triumphed in the Fresh Garden section. We featured in almost all national newspapers and were on TV virtually every day of the show, reaching 163 million viewers worldwide according to the RHS. The garden's *raison d'être* was to bring today's ideas about the universe to a different, but very receptive, audience.

## The groundwork

"Dark Matter" is not the first space-themed garden from the NSO: "The NSO: Watch this Space" won a gold medal at the smaller annual RHS show at Tatton Park in 2013. That garden came about because of a fortunate mix of circumstances, beginning with retired teacher Dori Miller, a Bode family friend and amateur plantswoman. She first exhibited at RHS Tatton in 2010, winning a silver medal for the garden "A Handbag of Harmonies" with her choir in Chester. Dori went from strength to strength as Oxfam, then the Quakers, asked her to do RHS Tatton gardens for them in 2011 and 2012. She won gold for both, in conjunction with her son Howard Miller, architect turned designer, and local landscape company Landstruction, headed by David Binks. Over lunch with the Bodes in late 2012, Dori mentioned that the show garden theme at RHS Tatton in 2013 was to be "The Galaxy" – and we went for it. "The NSO: Watch this Space" won gold, with Dori's team plus enthusiastic Liverpool John Moores University Astrophysics Research Institute staff and students acting as garden and astronomy guides to more than 11 000 visitors.

"How do we top that?" we asked ourselves. "Chelsea," replied Mike Bode to multiple groans: Tatton is hard work, but Chelsea is an order of magnitude bigger in every dimension. Mike came up with "dark matter" as a theme, despite not knowing how we would do it. Howard, however, came back a few weeks later with an ESA illustration of the detection of dark matter by its gravitational effect on light, which formed the basis of our garden.

Our goals were to interest and intrigue the public by representing a great mystery of the universe and at the same time publicize both the Science and Technology Facilities Council's science and LJMU's NSO project. We also wanted to show that science – even the areas that appear most esoteric – can be appreciated by anyone. We focused on how we detect the presence of dark matter from its gravitational effects, in this case the bending of light in a gravitational field as predicted in the general theory of relativity published by Einstein 100 years ago. The garden represents the passage of light from the "surface of last scattering" around 380 000 years after the Big Bang (represented by a giant light box at one end) to today, represented by the "oculus" viewing point (figure 1).

Working with an experienced garden design team, it was so impressive to see our vague idea translated into something meaningful, clear and downright beautiful. It was also fascinating to work at the boundaries of art, science and engineering. For example, the initial path of the light rays, represented by the steel pipes, was a reasonably accurate representation of what happens to light in the vicinity of a massive object. Howard then improved the aesthetics and we worked with a colleague of his in the Liverpool School of Architecture, who used 3D modelling techniques to ensure that it could actually be built.

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## Work of art

We are delighted that the resulting garden intrigues people and helps to explain a complex and important subject that most know little about while, at the same time, it is a work of art. The response of visitors at Chelsea – about 70% female – was almost unanimously a mixture of praise and intrigue. People usually commented first on the overall impact of the planting and the forms and colour of the steelwork. After a short explanation of what it represented, there was usually a "eureka" moment as the meaning became clear.

Our parting shot was to say: "If you know of a school that would benefit from being in the NSO, please take a leaflet and tell them about it," – we gave out more than 8000 of them.

Despite many hurdles, the whole experience was an absolute joy. As one of the other exhibitors remarked: "Where else can you go where everyone tells you you are brilliant continuously for a whole week? Certainly not academia!"

Luckily, the garden lives on. It will feature in Monty Don's TV series *Big Dreams, Small Spaces* in the autumn, and will be on permanent display at the STFC's Daresbury Laboratories in Cheshire, where school groups, employees and other visitors to the lab can enjoy it for many years to come. ●

**1** (Left): Looking back in time to the early universe. (Robert Holme)

**2** (Right): The garden – and universe – from the side. (Robert Holme)

**AUTHORS**
**Mike Bode** is director of the Astrophysics Research Institute and **Andy Newsam** is director of the National Schools' Observatory, both at Liverpool John Moores University.

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**WEBSITE**
http://www.schoolsobservatory.org.uk/darkmatter