

# Making a Big Bang on the small screen

A TV sitcom with two physicists as its central characters has proved an unlikely hit with viewers in both the US and the UK. **Nick Thomas** talks to the cast and the creators about the secrets of its success

While the quality of some TV sitcoms can leave viewers feeling cheated out of 30 minutes of their lives, audiences and critics are raving about the science-themed US comedy *The Big Bang Theory*. First shown on the CBS network in 2007, the series focuses on two brilliant postdoc physicists, Leonard and Sheldon, who are totally absorbed by science. Adhering to the stereotype, they also share a fanatical interest in science fiction, video-gaming and comic books, but unfortunately lack the social skills required to connect with their 20-something non-academic contemporaries.

*The Big Bang Theory* is now in its third season, with a fourth already commissioned by CBS. The show has also aired in the UK on Channel 4, while last month E4, Channel 4's digital network, started showing the third season. Despite a dialogue peppered with references to physics and mathematics (and, to a lesser extent, biology and chemistry), over 13 million US and 1 million UK viewers have been tuning in to follow the adventures of Leonard and Sheldon, together with their buddies, fellow physicist Raj and engineer Howard, and their "normal" neighbour, Penny.

Set mostly in the characters' apartment complex in Pasadena, California, Penny, played by Kaley Cuoco, is a wannabe actress who hangs out with her geeky neighbours. Although she has no understanding of their research, the "guys", in turn, generally fail to fit into her pop-culture-centred world, and therein lies much of the show's comedic appeal.

Kunal Nayyar, 28, who plays Raj, felt the show was destined to become a hit early in the first season. "The writing was brilliant and the show was funny, but it wasn't just about a bunch of scientists making jokes," says Nayyar. "The characters were going through life and trying to fit in. I think many people have probably felt like that at some point in their lives and can relate to it."

## Big impact

One fan of *The Big Bang Theory* is Jeff Tseng, a particle physicist from Oxford University in the UK, who stumbled upon the show accidentally and



## Stars of the show

Top, from left to right, Raj, Howard, Leonard and Sheldon build a robot to enter a fighting-robot competition. Bottom, Penny and Sheldon examine high-energy-physics equations in his apartment.

began noticing that the whiteboards in the background of scenes actually showed accurate physics equations. "There was a good first-order calculation of W-boson branching functions, plus some well-drawn quark flow and Feynman diagrams," he says. Getting the science right is almost unheard of in TV land, but series creator, writer and executive producer, Chuck Lorre, says that accuracy is important to the show. "It is those details that colour the tone of the show and contribute to its popularity, so we have a real physicist for help in that area," he told *Physics World*.

That "real" physicist is astrophysicist David Saltzberg from the University of California, Los Angeles (UCLA). The producers first contacted Saltzberg to see if he knew of any graduate students who could advise the show, but he saw the job as being a lot of fun and took up the offer for himself. Before the acting starts, Saltzberg receives scripts about a month in advance and fills in the sci-

ence as required. For example, in the first season, when the four guys buy a model of a time machine, Saltzberg wrote the equations for theoretical time travel using wormholes on the whiteboard in their apartment. In season two, the writers wanted a science project for Leonard to show his mother when she came to visit him at the lab. Saltzberg suggested that Leonard talks about the DAMA project at the Gran Sasso laboratory in Abruzzo, Italy, which searches for what constitutes dark matter.

Saltzberg is even on the set for the shooting of most episodes; so, if any technical questions do come up, he is on hand to answer them immediately. After colleagues and viewers wanted to know more about the show's science, Saltzberg started a blog in time for the third season in September 2009 called the *thebigblogtheory* to explain the science behind each new episode.

"One of the roles of a university is to reach back into the community and give people a glimpse at what we are doing," says Saltzberg. "With 13 million viewers watching a sitcom that references current physics research, maybe the show will do for physics what Indiana Jones did for enrolment in archaeology departments!"

Jan Hall from the University of Colorado, who shared the 2005 Nobel Prize for Physics with Roy Glauber and Theodor Hänsch for their work on quantum optics and laser spectroscopy, is another for whom *The Big Bang Theory* is his favourite TV programme. "My wife gave me the first season on DVD as a Christmas present in 2008 and we have been cracked up laughing ever since," says Hall. "The science chatter is mostly accurate, providing a technical backdrop to the interplay of personalities. Each individual is appealing in specific ways and contributes to the overall effect – it's just so damn funny!"

As a result of Saltzberg's input, Lorre says that the reception from the scientific community has been largely positive but that the show also appeals to audiences outside the scientific world. "It's not just a show about science. It's also about the characters' lives – their families, friends, hopes and romantic relationships," says Lorre.

## Physics 101

The idea for *The Big Bang Theory* sprang from co-creator Bill Prady's experiences working as a computer programmer in New York in the 1980s. Lorre says Prady worked with people who were clearly very intelli-

gent, but who were completely lost when it came to the mundane things in daily life. It was a paradox, and a terrific idea for a series.

“We wanted to avoid a show that was set in the world of computing – the computer-geek theme sounded too tired,” explains Lorre. “So we put the characters in a setting of pure research.” Building a sitcom around physicists, rather than any other discipline, was, for Lorre, an obvious choice. “There was just something fascinating about a show that looks at the world through physics and mathematics. These guys are trying to unravel the secrets of the universe – that’s pretty big! You’re not going to do that with biology or chemistry.”

In an interview with *Physics World*, actor Johnny Galecki, 34, who plays Leonard, says he and the cast constantly receive positive comments from teachers and scientists. “We got a letter from Isaac Asimov’s daughter telling us how much she liked the show,” he said during a break in rehearsals. “George Smoot even wrote to us asking if he could be on the show, and he appeared in a season-two episode. He was quite a character!”

As a tribute to Smoot, who shared the 2006 Nobel Prize for Physics with



Warner Bros Television/Entertainment

John Mather for their work on the anisotropy of the cosmic microwave background (CMB) radiation, a whiteboard during that episode contained a diagram of a differential radiometer that was used in the discovery of the CMB radiation.

To prepare for their roles, Galecki says he and Jim Parsons, who plays Sheldon, visited the physics department at UCLA with Saltzberg. “Our biggest lesson was that scientists are a diverse bunch,” says Galecki. “While we saw some people who were somewhat like the Leonard and Sheldon

#### Leading lights

Physicist David Saltzberg from the University of California, Los Angeles (left) and executive producer and co-creator Bill Prady (right).

characters, there were people from all cultures, female physicists, and even the cool surfer physicist, with bleached blonde hair, sunglasses, shorts and sandals.” Galecki adds that he and Parsons have also read a lot of popular science and watched science documentaries on TV. “You just try and surround yourself with the things your character would be interested in. For an actor, you research your role to gain confidence and hope the audience will find you credible.”

Simon Helberg, 28, who plays Howard, says the show’s popularity suggests that the cast has successfully created extreme but believable characters. “Unlike their research, there are no equations these guys can formulate to help them understand the world outside the lab. But they somehow manage to muddle through the more mundane aspects of life.” Although the characters may seem quirky and stereotyped, Saltzberg believes the show demonstrates the joy that scientists have for their work. “The characters are extreme and have their flaws, but that’s necessary for the comedy to work,” he says. “The characters have a real passion for science, but that’s not made fun of – I see that as being celebrated in the show.”

## Royal Society turns 350 as new Hawking portrait is unveiled



Royal Society

Despite retiring last autumn from the position of Lucasian Professor of Mathematics at Cambridge University, Stephen Hawking does not seem to be disappearing from the limelight. In August he travelled to the US to accept a presidential medal of freedom from President Barack Obama. Now, this portrait has been unveiled by Hawking himself at the Royal Society in London. It was painted by the British-born artist Tai-Shan Schierenberg, 47, who has four other works down the road at the National Portrait Gallery, including one of the poet Seamus Heaney. Hawking has been a fellow of the Royal Society since 1974 and published a paper on black holes with Roger Penrose in 1970 in one of the society’s journals (*Proc. R. Soc. A* **314** 529). It is one of 60 “trailblazing” papers selected from the society’s archives as part of its 350th anniversary celebrations (see trailblazing, royalsociety.org). Other special events being held this year include a nine-day science festival at London’s Southbank Centre from 26 June to 4 July and the opening of the new Kavli Royal Society International Centre for the Advancement of Science at Chicheley Hall in Buckinghamshire, which will let scientists discuss big ideas through two-day meetings.

**Matin Durrani**