Sociologist fools physics judges

After more than 30 years of studying the physicists who work on gravity waves, spending countless hours talking to physicists and writing a book on the history and sociology of the field, social scientist Harry Collins had a question. Could he pass as a physicist?

He reckons he can — and he has the experimental data to prove it. Collins's study, to be published later this year, is the first experiment on the concept of 'interactional expertise', an idea that could influence areas such as peer review and science journalism. It could even help settle a question lingering since the science wars of the 1990s, when sociologists launched what scientists saw as attacks on the very nature of science, and scientists responded in kind.

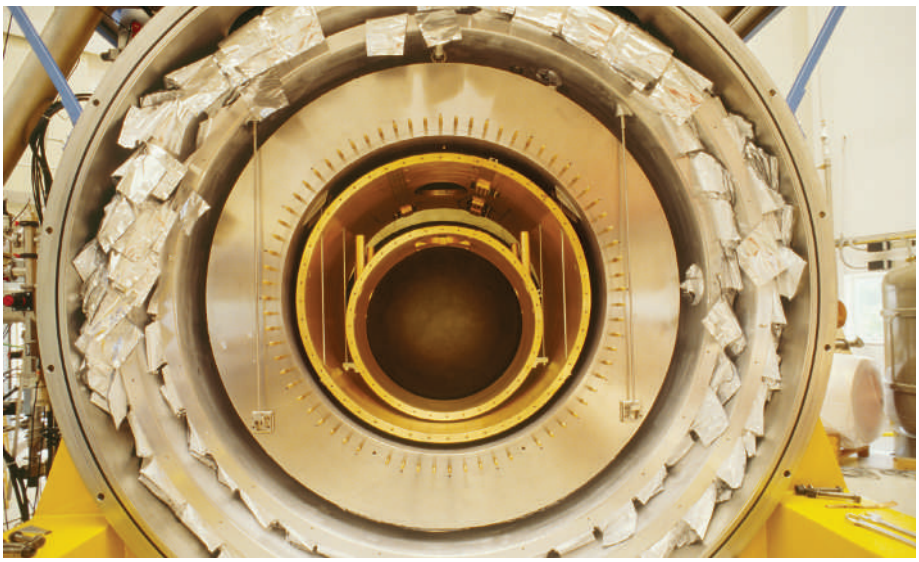
Collins's claim rests on his answers to a set of seven questions about gravity-wave physics set by a gravity-wave physicist. His replies, together with those from a real gravitational physicist, were sent to nine researchers in the field (see 'Faking it'). Asked to spot the real physicist, seven were unsure and two chose Collins. The results appear in a paper co-authored with Rob Evans, like Collins based at Cardiff University, UK. It is due to be published this December in *Studies in the History of Philosophy of Science* (for a preprint see www.cf.ac.uk/socsi/expertise).

Nature sent the questions and answers to Sheila Rowan, a gravitational-wave physicist at the University of Glasgow. She was likewise unable to spot the impostor. "The answers are different but it's not obvious which are not by a graduate scientist," she says.

"I could not run LIGO [a US gravity-wave detector] or do lots of other things," says Collins. "But the results do show that outsiders can develop a kind of expertise in a scientific field", even if they cannot carry out the relevant experiments and do not know the mathematics involved.

Collins says this kind of expertise, known as interactional to contrast with the 'contributory expertise' that comes from being able to do experiments and develop theories, should not be dismissed. He points out, for example, that it is important in activities such as grant allocation, in which peer-review panels may include scientists who know the concepts associated with a field, but lack technical understanding.

In a second experiment, Collins and Evans got groups of colour-blind people to pretend they could see colours. Judges compared their performance in conversation with that of people with normal sight. As Collins expected, the colour-blind, immersed in the language of colour vision, had the interactional expertise to pass as colour-perceivers. In contrast, people lacking perfect musical pitch could not pass for those who could. Very few have such an ability, so those lacking it have not learnt to describe how the skill feels.



T. GUICCIARDINI/SPL

He might not be able to run this gravity-wave detector, but a social scientist passed himself off as a physicist.

Faking it

One answer to the following question is from an experienced gravity-wave physicist, the other is from social scientist Harry Collins of Cardiff University, UK. To find out which is which, see page 15.

A theorist tells you that she has come up with a theory in which a circular ring of particles is displaced by gravitational waves so that the circular shape remains the same but the size oscillates about a mean size. Would it be possible to measure this effect using a laser interferometer?

A: Yes, but you should analyse the sum of the strains in the two arms, rather than the difference. In fact, you don't even need two arms of an interferometer to detect gravitational waves, provided you can measure the round-trip light travel time along a single arm accurately enough to detect small changes in its length.

B: It depends on the direction of the source. There will be no detectable signal if the source lies anywhere on the plane that passes through the centre station and bisects the angle of the two arms. Otherwise there will be a signal, maximized when the source lies along one or other of the two arms.

If the concept of interactional expertise catches on, it could affect the argument about whether an outsider, such as an anthropologist, can properly understand another group, such as a remote rural community. The debate was part of the science wars, when some scientists claimed that sociologists studying science did not understand the disciplines involved, in part because they did not practise them.

Collins's results do not end that discussion, but they do suggest that outsiders can develop expertise in a field. Collins says that investigators now have a way to display their expertise — and that they and their critics can talk sensibly about whether it is appropriate.

One of the main protagonists in the debate was Alan Sokal, a physicist at New York University who authored a spoof science-studies paper that was accepted by *Social Text*, a cultural research journal. The paper, which consisted of meaningless arguments about quantum theory, was intended to expose what Sokal and others saw as a lack of academic rigour among sociologists.

Sokal says he is struck by Collins's skills in physics, but notes that such understanding would not be enough for more ambitious sociology research that attempts to probe how cultural and scientific factors shape science. "If that's your goal you need a knowledge of the field that is virtually, if not fully, at the level of researchers in the field," says Sokal. "Unless you understand the science you can't get into the theories." ■

Jim Giles