the letter stated.

In response to concerns about the timing, ICTV president Andrew Davison, a virologist at the University of Glasgow, UK, says that a version of the proposal has been on the ICTV agenda for nearly two years, but he expects the committee to consider all the relevant factors at its meeting. "I agree that these are unusual times," he says.

In their letters, the ASV and AVS also state that they oppose the idea of mandating Latinized names, because that would require virologists to learn Latin grammar, and would be cumbersome to implement. Both groups prefer the option in which any word can be used as the species name, although the AVS's top preference would be to maintain the status quo, its letter states. "There is no need to overhaul the whole system," says AVS president Gilda Tachedjian, a virologist at the Burnet Institute in Melbourne, Australia.

But when naming a species, virologists would need to know only the appropriate Latin suffix, says Jens Kuhn, a virologist at the Integrated Research Facility at Fort Detrick, Maryland, and a member of the ICTV executive committee. Latin terms would also be universal, not requiring translation in papers published in languages other than English, he says.

SARS-CoV-2 diversity

Virologists are less conflicted about the urgent need for coherence in naming the many SARS-CoV-2 lineages, which are being labelled in an ad hoc manner. "We are clearly going to end up with more than 100,000 complete genome sequences of SARS-CoV-2, which is staggering. It is obviously important to come up with a simple, rational and widely adopted scheme to classify all this diversity," says Holmes.

No official body decides how to name viral lineages. "We've stepped in to try and sort this out. Whether people will adopt it is another matter: it's really up to the users," says Holmes.

He and his colleagues have proposed a dynamic method that prioritizes naming lineages that have seeded an epidemic. The lineages would be labelled active, unobserved or inactive depending on how recently they have been isolated; these labels would be reassessed regularly, on the basis of whether the lineages are still spreading. The researchers described the method in their *Nature Microbiology* paper on 15 July, and seem to have gained support among virologists. They have also developed online tools to help users identify which lineage their sequence belongs to.

Such a system could make it easier to monitor lineages with unique pathogenic properties when they arise, says Elliot Lefkowitz, a virologist at the University of Alabama at Birmingham and member of the ICTV executive committee.

Q&A

BOB PAZ/CALTECH

The mathematician who helped to reshape physics

In 1983, mathematical physicist Barry Simon uncovered a surprising connection between a phenomenon in materials and a branch of mathematics called topology. Topology is the study of physical shapes that deform continuously. But the field has now proved crucial to understanding the shapes of quantum waves formed by the electrons inside certain materials. These waves can form topological shapes such as vortices, knots and braids, and create a variety of exotic properties. Simon's work explained a strange phenomenon related to resistance called the quantum Hall effect, first described in a semiconductor by German physicist Klaus von Klitzing 40 years ago this month. Under certain conditions, the electrical resistance in a material jumps predictably, rather than moving continuously, because of the topological behaviour of the electrons. With collaborators, Simon showed that the equations created to describe the quantum Hall effect were a manifestation of topology. Researchers are now using ideas from this field to predict more physical phenomena, and hope these behaviours could be applied in fields such as quantum computing. *Nature* spoke to Simon to ask how it all started and about the relationship between mathematics and physics.

What made you think there was a connection between the quantum Hall effect and topology?
The thing that's surprising about the quantum Hall effect is that something that appears to be continuous is quantized — it comes in discrete units. When I saw [theoretical physicist] David Thouless's quantum Hall formula, I immediately thought of a topological concept called homotopy. The simplest example to think of is how a circle can continuously map to itself. In the case of the circle to a circle, there is a key issue: one circle winds around the other an integer number of times. And if you continuously deform the map, you're not going to change that number.

So in your papers, you showed that this topological effect, called the winding number, made the resistance of the semiconductor jump between discrete values. Did you imagine that the discovery would be so successful?
I knew it would make a splash because it would appeal to high-energy physicists, who were already accustomed to ideas from topology. I didn't realize it would have this long-lasting impact in solid-state physics.

As a mathematician, do you think in a different way from theoretical physicists?
There is a sharp dividing line between physicists and mathematicians: whether you really 'prove' things in the mathematical sense of proving things. It's the difference between demonstration and proof. There is a very different style.

How would you describe the relationship between the two communities?
It depends on the subfields. The condensed-matter physicists were so used to being looked down on by the high-energy physics community — particle physicist Murray Gell-Mann described condensed matter as "squalid-state physics" — that they didn't look down on other people. There's a tradition among high-energy physicists and string theorists that's not very positive towards maths. Sometimes there's a lack of mutual respect.

Is that bad for research?
It's certainly bad for life — it makes life less pleasant. Is it bad for business? Would science progress more without it? I don't know. To the extent that these cultural things prevent collaboration, it's very bad. Although sometimes it's not clear, even if people were more accepting of each other, that they could successfully collaborate.

Have interactions between the two communities improved since the 1980s?
There are still separate camps, but the landscape has changed enormously. There is much more attention in both directions now than there was 40 years ago. It amazes me what has happened to the use of topological ideas in condensed-matter physics. It's really, really striking.

Interview by Davide Castelvecchi
This interview has been edited for length and clarity.