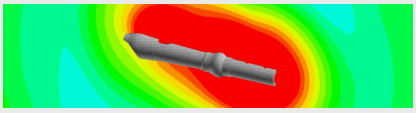

Simulating sound with supercomputers could lead to development of easy-to-play musical instruments

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Videos courtesy Hiroshi Yokoyama, Akiyoshi Iida,

Hirofumi Onitsuka, and Akira Miki.

Do, re, mi... it's as easy as H-P-C!

Learning to play a musical instrument can be a tricky process, but a research team in Japan is hoping to make it easier by simulating the acoustics of recorders. Hiroshi Yokoyama from the Toyohashi University of Technology and colleagues have used supercomputers to model this simple woodwind instrument.

Tags

HPC
Japan
Music
recorder
sound
supercomputer
tone

Children in Japan - as in many other countries across the globe - are taught to play the recorder at school. For many it is their first time playing an instrument.

"It takes two weeks to create these simulations, but the results are useful for improving the design of musical instruments," says Yokoyama. "This research might lead to the design of musical instruments that are easy for children to play."

Of course, the research also has more fundamental value in terms of improving our understanding of soundwaves. "When I spoke with people involved in making musical instruments, I was surprised to find that the phenomena of flow and sound have not been yet been well understood," says Yokoyama, who also studies aerodynamic noise from high-speed vehicles such as automobiles, aeroplanes, and trains. "It is known that even the slightest difference in the shape of an instrument can affect tones significantly."

The top video shows the sound field around a recorder and the second video shows the acoustic resonance within a recorder. In both cases, all holes are fully open and the colours represent pressure fluctuations (see key at top left of videos).

The bottom video shows the relationship between flow and acoustic radiation. Again, all holes are open and the colours represent pressure fluctuations. The grayscale indicates flow.

Yokoyama and colleagues presented this work at the 43rd International Congress on Noise Control Engineering in Melbourne, Australia. Find out more here.

- Andrew Purcell

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