CROWN JEWEL

‘The quantum world is a magical world’

‘The development from abacus to computer seems like a big step. But they calculate in the same way; a computer is just faster,’ says Carlo Beenakker, professor of theoretical physics at Leiden University. ‘For the last decade or so, physicists have been working on a technique that computes in a radically different way: the quantum computer. It calculates with qubits.’ Unlike an ordinary computer’s bits, which are zero or one, qubits are a combination of zero and one. Thanks to the quantum properties of qubits, certain calculations can be performed much faster. But because of that, you have to program them completely differently than a regular computer.

‘I do research on programming quantum computers as well as on making qubits,’ Beenakker says. ‘As a theoretical physicist, I don’t create the qubits myself; I invent and predict ways to make them. Delft researchers, with whom I collaborate, make them.’

‘In terms of programming, the question now is: who will find the killer app for the quantum computer? In the 1950s, no one imagined that, for the computer, it would be the worldwide web – the www. I’m not going to find that killer app, but I’ve surrounded myself with people who have ideas about it and are looking at, for example, a combination of artificial intelligence and quantum.’

Beenakker, who did not begin quantum research until later in his career, is enthusiastic about the field: ‘It’s beyond your intuition, which makes it a completely different, magical world in which to explore. And you are dependent on mathematics to avoid going astray.’

Text: Dorine Schenk

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