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## Great maths puzzle 'solved'



holes. But the proof of the conjecture has eluded mathematicians.

Poincare himself demonstrated that his earliest version of his conjecture was wrong. Since then, dozens of mathematicians have asserted that they had proofs until fatal flaws were found.

### **Internet rumours**

Rumours about Perelman's work have been circulating since November, when he posted the first of his papers reporting the result on an internet preprint server.

Since then, Perelman has persistently declined to be interviewed, saying any publicity would be premature.

Dr Tomasz Mrowka, a mathematician at the Massachusetts Institute of Technology, said: "It's not certain, but we're taking it very seriously.

"We're desperately trying to understand what he has done here," he adds.

Some are comparing Perelman's work with that of Andrew Wiles, who famously solved Fermat's Last Theorem a decade ago.

Indeed, Wiles was in the Taplin Auditorium at Princeton University, New Jersey, where he holds a chair in mathematics, to hear Perelman describe his work recently. Behind him sat John Nash, the Nobel Laureate who inspired the film *A Beautiful Mind*.

### **Million dollar afterthought**

What is all the more remarkable about Perelman's proposal is that he is trying to achieve something far grander than merely solving Poincare's Conjecture.

He is trying to prove the Geometrisation Conjecture proposed by the American mathematician William Thurston in the 1970s - a far more ambitious proposal that defines and characterises all three-dimensional surfaces.

"He's not facing Poincare directly, he's just trying to do this grander scheme," said Professor Peter Sarnak, of Princeton.

After creating so much new mathematics, the Poincare result is just "a million dollar afterthought," he said.

If Perelman has solved Thurston's problem then experts say it would be possible to produce a catalogue of all possible three-dimensional shapes in the Universe, meaning that we could ultimately describe the actual shape of the cosmos itself.

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