

Interview with authorized answers from Peter Scholze

– for general use

What does the award mean to you?

This award is a great honor for me. The Fields Medal is one of the most important awards that mathematicians can receive - and probably the most renown. The prize is a great acknowledgement of my work.

Did the prize come as a surprise to you?

Even though - or precisely because - it was previously suggested to me from all sides that I will “of course” receive the Fields Medal, it was a great surprise and joy to actually be awarded the prize.

How did you feel when the award was announced? Did you celebrate?

I was certainly euphoric when I got the message. I told my closest friends and celebrated a little on that day.

The award is comparable to the Nobel Prize. What does this change in your life?

The Fields Medal is widely regarded as the ‘Nobel Prize of Mathematics’. However, I personally am of the opinion that the Abel Prize does more justice to this claim. I hope that the prize won't change much in my life.

What are you going to do with the prize money?

I'll see - so far only a bottle of champagne is planned.

Can you please briefly outline the achievements for which you will receive the award, in a way that is understandable for laypersons?

Roughly speaking, it is about better understanding the relationship between algebra/number theory and geometry. There is a strong relationship between algebra and geometry. Each geometric object has a ring. A ring is an algebraic object with which one can “calculate” - in the simplest case the integers. In turn, each ring also has an associated geometric object, a space. For the integers this space is called $\text{Spec}(Z)$, the so-called spectrum. The points in this space correspond to the prime numbers. Usually this space is given a structure that is not yet particularly geometric. But if you take a different view of it, you can see it as a three-dimensional real manifold, like a very geometric object. Part of my work consists of making $\text{Spec}(Z)$ “more geometric”, at least in small environments of prime numbers. Work here is usually done with so-called p -adic numbers. The p -adic numbers in number theory correspond to the power series for functions in analysis. I have developed methods to better understand these p -adic numbers geometrically. This made it possible to solve some unresolved problems of algebra and number theory.

Is there a practical orientation for this field? How does this benefit humanity? How does this benefit science?

In the basic sciences, especially in pure mathematics, you never know which practical applications will arise at some point. In general, mathematical research produces new, universal knowledge that is valid for all times. Mathematics is the most cumulative of all sciences and therefore extremely rich. I hope that through my research in the field of arithmetic geometry, mathematical structures and relationships will be better understood.

What is your next step in your career? What goals have you set yourself?

I will stay in Bonn and in the future I will also work as Scientific Director at the Max Planck Institute for Mathematics in addition to my position as “Hausdorff Chair” at the Mathematical Institute. My goal is to better understand mathematical structures in general. Specifically, I hope, for example, to contribute to further advancing the Langlands program, in which fundamental connections between different mathematical fields are postulated.

You are a particularly young medalist, you have achieved practically everything. Which aspirations are yet to be fulfilled?

I used to want to stay in academia so I could pursue my passion for mathematics. This wish has been granted to me. And I've only just started mathematical research.