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**Laws of the Universe - are they laws of physics or just rules of mathematics?** ALEXANDER PANIN, Utah Valley University — Physics is an experimental science in which we make objective observations (measurements) and discover certain rules and laws that the Universe obeys. But after a close look at these rules (or after new experimental discoveries are made) we find that they actually are the direct mathematical consequences of more simple rules, which we call symmetries. In some cases laws are even just mathematical consequences of definitions (!). So, it seems that if the mathematical origin of some phenomenon is known - then we call it mathematics, but if it is (yet) unknown - then we call it physics. To only discover later that it is also mathematics after all. So, is there any physics in our Universe, or it is just all mathematics? Examples of various “laws of physics” with the analysis of their mathematical origin, and the insight in what actually mathematics is (and why it is so powerful in describing and predicting the behavior of our Universe) are discussed in the presentation.

Prefer Oral Session  
 Prefer Poster Session

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