What Lakatos Could Teach the Mathematical Physicist

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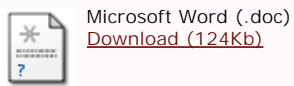
Abstract

In their 1993 article "'Theoretical Mathematics': Toward a Cultural Synthesis of Mathematics and Theoretical Physics" published in the Bulletin of the American Mathematical Society, the eminent mathematical physicists Arthur Jaffe and Frank Quinn proposed a set of prescriptions for the interaction between mathematicians and theoretical physicists that should foster mathematicians' receptivity of ideas from physics by safeguarding mathematical rigour against uncontrolled speculation. The proposal propelled and intensive debate in the Bulletin and lead to a special issue of the journal Synthese. So far, however, philosophers of science have hardly addressed this debate, perhaps because it lacks a systematic framework. In this contribution I portray the various stances taken in the Jaffe-Quinn debate from the perspective of Imre Lakatos philosophy of mathematics that seems most suitable for a debate concerning mathematical growth. After outlining the lessons to be drawn for it from Lakatos's published works, I examine which modifications of Lakatos's account are in place to enable a fruitful assessment of present mathematical physics in which axiomatization plays a key role.

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