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Report - PhD Thesis Sergio Morales Tejera

To whom it may concern,

With great enthusiasm, I have read the PhD Thesis “Real-Time Holography: Anomalous Transport and Non-Hermitian Systems” written by Sergio Morales Tejera, and I rate it with the highest grade possible.

In the above mentioned thesis, Tejera considers a hard problem, namely the time dependence of two distinct types of systems: 1) The quark gluon plasma (QGP) generated in heavy ion collision experiments as produced at the Relativistic Heavy Ion Collider at Brookhaven National Lab, Upton (New York, U.S.A.), or at the Large Hadron Collider at CERN, Geneva (Switzerland). 2.) PT-symmetric systems as they are studied in open quantum systems realized in non-Hermitian Weyl semi-metals or certain optical systems studied for example at the Max-Planck-Institut in Erlangen, Germany. Both of these types of systems are currently very active, the second one very new, having created a wealth of publications. Studying time dependence in any system is already difficult, however, in the systems mentioned above this is intrinsically hard. Tejera overcomes this difficulty by application of holographic methods, based on the gauge/gravity correspondence discovered in 1998 by Maldacena and others and actively developed since then. Tejera’s impressive work requires a unique skill combination of numerical programming and analytical knowledge. This is why his work was the first to simulate the time evolution of the chiral magnetic effect in QGP.

The excellent content of this research work is evidenced by the associated publications in high profile and high impact journals, among them Physical Review D (PRD) by the American Physical Society. Three directly related articles have been published by Tejera in PRD, one is in progress, three further publications related to other topics are published or in the process of being published. It is remarkable that two of these publications were written by Tejera with one or two other junior researchers (postdocs), which shows his independence as a researcher at a very early stage.

In summary, I congratulate Sergio Morales Tejera on an outstanding research work, publishing important results to two very active areas of theoretical and experimental physics.

With kind regards

Prof. Dr. Matthias Kaminski

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