

Quantum Analogs

“Acoustic Experiments Modeling Quantum Phenomena”

QA1-A

ADVISOR MANUAL

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A PRODUCT OF TEACHSPIN, INC.

Designed in collaboration with Professor Dr. Rene Matzdorf

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<p>Passages meant Only for the Instructor are presented in Franklin Gothic, titled ADVISOR INFORMATION, and boxed. They are not included in the Student Manual.</p>

Introduction to TeachSpin's Quantum Analogs

“Quantum Analogs” is TeachSpin’s contribution to the teaching of wave mechanics. The idea at the heart of this apparatus is the analogy between the mathematics of the Schrödinger wave equation, and the wave equations that describe the behavior of ordinary sound waves in air. Parts of our acoustic apparatus will allow you to explore acoustic analogs to quantum-mechanical systems in one, and three, dimensions. One of the advantages of the ‘acoustic analog’ is that sound phenomena occur on a very human scale of length and time.

The hardware you will use is built and supported by TeachSpin, and questions about the hardware should be directed to TeachSpin. All warranty issues will also be handled by TeachSpin.

For several of the investigations in Quantum Analogs you are welcome to use software written and maintained by Prof. Dr. Rene Matzdorf, the developer of the project. This software is free, but comes without any warranty or liability. Be sure to check the internet page Dr. Matzdorf has created, www.physik.uni-kassel.de/quantum-analogs, for program download, manual of the program, frequently asked questions and software updates. The page also offers several excellent visualization programs that you are welcome to download. In case of problems with installation of the connection to the computer you may contact Prof. Matzdorf directly. Bugs in the software may also be reported to be corrected in the next update (matzdorf@physik.uni-kassel.de).

A detailed description of the function of each part of the Controller Box is provided in Appendix 1. Please read it before beginning any experiments.