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Prof. RNDr. Pavel Tománek, CSc.

Supervisor's review of the Dissertation Thesis

of Mr. Hamed Mohamed ABUBAKER, MSc.,
“Study of scattering and polarization of light in biological tissue”
and of the candidate's activity during PhD studies

Mr. Hamed Mohamed Abubaker, MSc. was born in 1966 in Libya. In 1990 he graduated with the BSc. Degree in Physics Science at Sebha University, Libya and has been involved in teaching at the same Sebha University, Department of Physics. Later, in 2001 – 2004 he studied at the Wroclaw University of Technology, Poland and he graduated in 2004 with the MSc. Degree in Solid State Physics.

Since his admission to the PhD studies at the Faculty of Electrical Engineering and Communication, Brno University of Technology in Brno, Czech Republic, in 2009, he began to work in domain of Interaction of light with matter and to study optical properties of biological tissues. Though the proposed topic was absolutely new for him, he took it in serious and studied the theoretical background and investigated it with reliable approach.

The objectives of his study were to understand the behavior of different kinds of optical properties of biotissues – mainly forward and backscattered light. He also took part in the Department research activities in the frame of Research intention Mikrosyn.

He also substantially extended his knowledge and experience with measurement and computer work. I particularly appreciate that he mastered some basic rules of the research work, like search for the previous results in scientific literature, adoption of the best experimental practice from elsewhere in contrast to developing everything from the very start, necessity to quest for new findings in contrast to mere compilations and, last but not least, assuming responsibility for his own work and for “selling” its results to the scientific community. He published alone or with colleague 9 papers concerning this studied topic in one Journal, leading International conferences as well as Student conferences.

I am of the opinion that Mr. Hamed Mohamed Abubaker, MSc. managed to master a broad range of topics associated with his studies. In his thesis he presents a digest of his papers on mentioned materials. He studied not only known phenomena, but also tried to contribute in less known domains. The novelty in his thesis consists in the profound study of optical activity (chirality) of meat going to the ageing, which could serve as a predictor of meat ageing quality. He evaluated the influence of forward and backward single or multiscattered light and its polarization characteristics. He received some nice results, which now need to be treated more in details.

In conclusion, I am of the opinion that Mr. Hamed Mohamed Abubaker, MSc. provided a serious work. I recommend the committee to accept the thesis and to award him with the degree “Philosophiae Doctor” (Ph.D.) in “Physical Electronics and Nanotechnology”.

Brno, February 1, 2013

Prof. RNDr. Pavel Tománek, CSc.
Supervisor