Thesis supervisor's review

Name of the student: Iurie Coroli
Title of the thesis:Low offset drift - low noise orthogonal fluxgate with synchronized polarity flipping
Grade proposed for the thesis: A – Excellent

The thesis presents a new type of magnetometer with extremely stable offset, at the top level in this class of instruments. The results included in this thesis will be shown at EMSA 2016 conference next month in Turin.
The student has worked hard to achieve this result. He has actively cooperated with the supervisor during endless sessions in the laboratory for the whole year.
The work of the student was focused on two main skills: first he learned how to design some basic electronic circuits and the related PCB as well as to manufacture them. During this period of time the student became independent in being able to read datasheet to find the needed information, to choose the proper components, to design the board and assemble them. Even if the complexity of the circuits was not extremely high, this experience in the lab was enough to rise the student from the I-have-never-soldered-SMDs!-I-have-no-idea-how-to-hold-a-soldering-iron level to the no-problem-I-am-gonna-do-it-myself level. Mission accomplished.
The second main skill was developing an approach to scientific investigation. During the development of this magnetometer the student had to face questions which still did not have an answer in literature. For instance, to which extend the switching of polarity introduced noise to the output signal in order to choose the best strategy for noise reduction. Therefore, the student was experiencing a simple example of research: he learned how to make the correct measurements (including the analysis of the obtained data) in order to obtain the needed information and how to interpret it. He gained experience in the lab becoming confident in the good-practice for avoiding possible mistakes in the experiments and artefacts.
The student was guided to understand how to set a theory and how to choose the proper experiment to verify it. From this point of view the student showed to be very receptive and promising. He was able to handle long discussions with the supervisor at the same level. He was able to criticize the ideas proposed by the supervisor (and also to be accidentally right, from time to time) as well as to propose his own ideas. If I really have to make a remark I would say he needs to be more patient, and not to necessarily expect immediate results.
In the original thesis it was planned to make a connection between the DDS board the student had developed during the winter semester to the flipping stage of the magnetometer. This part was

finally skipped because I preferred the student to focus more on the scientific part of the project, as the results were promising and I preferred to have him experience some example of research instead of developing an extra board. The results he obtained about the synchronization using waveform generator can easily be extended to the DDS board.

Finally, the student has both improved his practical skills in the lab as well as he has learned how to perform a simple task of scientific investigation. I suggest the commission to give him the grade A.

Košice, 13th June 2016

Ing. Mattia Butta, Ph.D.