

Jaakko Murtomäki's Thesis Review – Formal Requirements from the University

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Dissertation types

- ▶ Monograph
 - ▶ Requires 1-3 ranked publications (like IEEE TAS, SUST etc) to support the work
 - ▶ Max 150 pages manuscript
 - ▶ Independent research publication
- ▶ Compilation thesis (typical in technological studies in Finland, > 90%)
 - ▶ Typically 4-6 publications, first author in at least 3
 - ▶ Manuscript is 50-100 pages introduction (to the field, and research methodology) and summary of the main results, but still a consistent and logical entity, and publications are in appendix

Doctoral studies in Finland

- ▶ Student needs 40 credits
- ▶ General studies at least 5 credits (Jaakko has already passed), major at least 25 credits
- ▶ Books can be accepted with an exam or essay/review (about 1 credit per 70 pages, maximum 7 credits per book)
- ▶ Advanced higher-education level courses/seminars taken anywhere can be accepted (like summer schools)

My general impression about the plot

Via structural modelling understanding to successful realization of HTS based particle accelerator (prototype) magnets

- ▶ Mechanical modelling of Feather magnets + experiments, including more fundamental research on *how to model*
- ▶ Feasibility of different impregnation materials for different HTS tapes / cables based magnets
- ▶ Quench detection based on "mechanical" signals
- ▶ Then the final task is to tight these topics together

Time frame

- ▶ Recommended duration is 4 years full time work, but it is not limited in Finland
- ▶ 3 years in CERN and 1 year in Tampere University of Technology, starting 2017/10 (funding to be found, should be organizable)
- ▶ Work at TUT is for finalizing the on going scientific projects (i.e. publishing papers from almost ready work that are not yet published) and writing the thesis
- ▶ After everything is finished, it will take 5-6 months before the public defense
 - ▶ External review (2-3 months, 2 reviewers not sharing any publications with the candidate or supervisor in last 5 years)
 - ▶ Two faculty meetings with 3 weeks between the meeting and submitting material
 - ▶ Publication of the thesis at least 10 days before the public defense

My experience in doctoral supervision

- ▶ 4 theses solely supervised, 1 for the last two years alone
- ▶ Tiina Salmi was 3 years with Berkeley, came to us and Finished in 17 months, but things were very mixed up
- ▶ Other 4 have been all the time under my supervision
- ▶ Topics:
 - ▶ AC-loss modelling with FEM
 - ▶ Characterization of MgB_2 superconductors in conduction-cooled systems
 - ▶ Using FEM and GA to find NbTi wires with lower AC-losses
 - ▶ Optimization of quench protection heaters
 - ▶ Quench modelling of HTS magnets