**Master Thesis Proposal** – Scientific Working Content - MedAustron (V. Letellier, L. Grevillot, M. Stock)

## DEVELOPMENT OF A USER INTERFACE TO FACILITATE MEDICAL PHYSICS QA DATA FOLLOW-UP

Start: Q3 2017

*Background / Introduction:*

MedAustron is a particle therapy and research center located in Wiener Neustadt, where cancer patients are currently treated with protons. The medical physics team is responsible for the acceptance and medical commissioning of all medical products which are related to ion beam therapy and imaging application:

- Patient imaging system: CT, MRI, PET, Imaging ring
- Proton and carbon ion beam lines
- Robotic arm for the patient positioning
- Precision dosimetry equipment: Ionization chambers, scintillator, water phantoms

Those medical devices are strictly verified following a periodic Quality Assurance (QA) program. All the results are saved inside a SQL QA database thanks to a commercial software which also allows for visualizing the latest QA results and for providing basic trendlines.

*Scientific Content:*

The content of the proposed thesis is to extract from the QA database all the important results using some filters or keywords and to analyze the data using statistical methods and display relevant plot methods for the medical physicists. The first step will be to compile the extracted data inside standard output files (ascii, csv, excel…) using easy user interfaces and then to improve the user experience to finally achieve a web or software interface including: statistics, plotting, trendlines, comparison. As final result the analyzed data over a one year period should allow conclusions on possible optimization of QA periodicities and adaptations of tolerance and action levels.

*Material and Methods:*

At MedAustron the realization of the proposed project is connected to the usage of Microsoft SQL Server and MyQA from IBA (Ion Beam Application). The basic data analysis may be performed using Python. Web analytic and data visualization could be deployed using a Reporting and Dashboard software (like Birt, Plotly etc...). Measured data will be available at the time of the completion of the thesis to consolidate the results and conclusions. The final tool will have to be verified, validated and documented following the ISO standards.

*Competences:*

The student would need a strong interest into Information technology (IT), especially Python and MS-SQL, but also understanding of the Medical Physics QA procedures implemented. He/She must be able to acquire technical knowledge and to have in-depth reflection.

Please submit your complete CV to: markus.stock@medaustron.at