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## Review Dr. Aleksandra Wronska

Dear Prof. Golak,

I am pleased to write this review of the scientific achievements of Dr. Aleksandra Wronska, as you requested. After reviewing her CV and based also on my assessment of the scientific achievements and publications of Dr. Wronska, I am convinced, that she is an outstanding researcher and very well qualified to be awarded a habilitation in physics at the Jagiellonian University in Krakow. I have not worked with Dr. Wronska and my evaluation is solely based on the documents you sent me, as well as her published work.

Concerning my own profile, I want to state that I am a full Professor for Medical Physics at Heidelberg University since 2010. Currently I am heading the research division *Medical Physics in Radiation Oncology* of the German Cancer Research Center, which is one of the leading cancer research centers in Europe. In parallel I am heading the Medical Physics team at Heidelberg Ion Beam Therapy Center, a center operated by the University hospital. My research is focused on novel methods for radiation therapy and in specific on ion beam RT, novel image guided RT as well as optimization algorithms for treatment planning. I obtained a PhD in physics in 1994 and since then I co-authored more than 300 peer review journal papers.

Dr. Wronska studied Physics at the Jagiellonian University in Krakow and finished in 2000 with a Master's degree. She then moved on to obtain a PhD in physics at the same university in 2005. Since then she has been working as a researcher and teaching assistant and since 2010 as an assistant professor in the nuclear physics department. Her work is focused on nuclear physics and hadronic interactions from her early career on. Already during her PhD project, she was involved in experiments on  $\eta$ -meson production and acted as a spokesperson for her experiment at the cooler synchrotron COSY at the research center Jülich, which is already a quite remarkable achievement. She then continued to work in other experiments, like PANDA and WASA@COSY in Jülich and also at other centers like KVI (Netherlands), Mami and GSI (Germany), etc. before she started to work on a project investigating the use of prompt gamma emission for range monitoring of clinical proton beams, which became available about 10 years ago in Krakow.

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This last topic is the focus of her habilitation and concentrates on the measurements of cross sections, relevant for prompt gamma imaging, as well as spectroscopic studies and development of detector concepts, like a fiber-based Compton camera. This topic is overall of tremendous value to the proton therapy community, as it may ultimately allow to verify the range of protons in the human body during irradiation, which is one of the biggest uncertainties of this treatment modality. The possibility to measure range by such a method, would have great impact on the whole field of proton therapy.

In all her projects, Dr. Wronska made substantial and significant contributions to the field and published a remarkable number of peer reviewed publications. Overall Dr. Wronska has authored 113 peer-reviewed journal publications, 19 review articles and received more than 2000 citations of her work. Her h-Index is 26, which is also a remarkable achievement, specifically with regard to the fact, that she is a mother of two young children.

She also managed to acquire substantial third-party funds over the last years and has demonstrated her great ability in grant writing and managing projects. Finally, she also is heavily engaged in teaching activities with a substantial list of courses and classes, she has been teaching. This also includes supervision of around 26 young academics during their Bachelor's and Master's thesis in Krakow and at RWTH, as well as several PhD theses, she is co-supervising.

In summary, I want to state, that Dr. Wronska clearly is an outstanding scientist and academic teacher, who has proven to be an exceptionally successful researcher in nuclear physics and its applications in medical physics. She clearly has an international reputation for excellent academic achievements. Over the years, she has also demonstrated a continuous strive for innovative research, which is underlined by her remarkable publication record. In doing so, she has, over the years, established herself as a renowned expert and leader specifically in the field of prompt gamma imaging for proton therapy.

Therefore, I would like to stress again my strong support for her application. I am sure, she will continue to be a valuable member of your faculty at the Jagiellonian University in Krakow and contribute to further improvements in particle beam therapy for the benefit of patients.

With kind regards,



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