THE ADJUDICATION COMMITTEE'S EVALUATION OF THE CANDIDATE'S DISSERTATION

(Is to be submitted to the Department 5 weeks prior to the planned disputation,
the evaluation must reach the Faculty no later than 4 week before the planned defence)

The adjudication committee has had the following members:

Professor **Marek Ploszajczak, *Grand Accélérateur National d'Ions Lourds (GANIL), FRANCE***
Associate Professor **Scott Bogner, Michigan State University, East Lansing, Michigan, USA**
Professor **Trine Tveter, Department of Physics, University of Oslo, NORWAY**

Gustav Ragnar Jansen has written the dissertation with the title:
"Coupled-cluster theory for open-shell nuclei"

Evaluation of the candidate's dissertation, each of the following aspects must be answered:

The dissertations field of research:

Theoretical nuclear physics.

The content and objective of the dissertation (short description, work of great merit and other important details on the theoretical and/or experimental side should be mentioned):

The thesis presents recent advances within the microscopic many-body theory of nuclear structure, more precisely new methods developed within the framework of the so-called Coupled Cluster approach. The thesis is written as an extended introduction and resume of four papers. The first paper presents a proof-of-principle of the new method, while the second one gives a comprehensive treatment of the mathematical framework. In the two last papers, the method is applied to specific, medium-mass nuclei and the results compared with experimental data, showing good agreement. The thesis points out the importance of the three-nucleon interaction, which has been included using a novel and highly successful approximation. In conclusion, also some limitations of the model are identified, and a roadmap is provided for future improvements.

For further details, please refer to the report attached.

The candidate's original contribution and independence in research:

In all four papers included, the contribution of Gustav Jansen is very significant. In two papers, Gustav Jansen is the first author, and in one paper (the mathematical details of the model), he is even a single author. These records prove his great independence in research and confirm his significant contribution to the modern microscopic nuclear structure theory.

The scientific standard of the dissertation (strength and weaknesses):

The scientific standard of the dissertation is very high. The topic is challenging (improvements of state-of-the art computational methods at the frontier of modern nuclear structure theory) and the author makes new and valuable additions to the existing toolkit, while also critically evaluating the methods in a professional way. The thesis formulates and advances several interesting questions which point the way for further studies. For further details, please refer to the report attached.

The committee is unable to point to any significant weaknesses.

The candidate's perspective on the research area and his/her ability to view own research in a greater context:

The scientific work is firmly placed in context within the very fundamental, complex and long-standing problem of describing the nuclear many-body system in a consistent and mathematically feasible way. This broad perspective is visible in all parts of the thesis, and the treatment is of high didactic quality.

The technical quality of the dissertation (outline, depiction, general impression, level within an international setting):

The technical quality of the dissertation is very high. The presentation is overall clear and lucid.

Other comments (any dissents in the committee should be mentioned here):

Please refer to the detailed report attached.

The report shall conclude whether the dissertation is worthy of being defended:

☒ The dissertation is worthy of defense without changes

☐ The dissertation is worthy of defense, but the dissertation or the scientific work has minor shortcomings that should be corrected before the defense. The candidate should normally be able to do this within two months. No re-examination is necessary.

☐ The dissertation is possibly worthy of defense, but the dissertation or the scientific work has major shortcomings that should be corrected before it can be defended. The candidate should normally be able to do this within six months. The dissertation should be re-examined by the original adjudication committee before final approval for defense.

☐The dissertation or the scientific work falls short of the standards required for a PhD, and it is found not worthy of defense.

PLACE: Oslo. **DATE: July 3, 2012**

SIGNATURES:

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	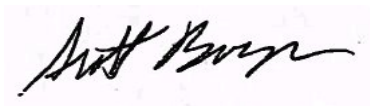	
Prof. Marek Ploszajczak	Ass.Prof. Scott Bogner	Prof. Trine S. Tveter