ČVUT
ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

SUPERVISOR'S ASSESSMENT OF FINAL WORK

I. IDENTIFICATION DATA

Title:	**Non-Gaussian Boson Sampling**
Author´s name:	**Meet Panchal**
Type of assignment:	Master Thesis
Faculty:	Faculty of Nuclear Sciences and Physical Engineering (FNSPE)
Department:	Department of Physics (DP)
Supervisor:	Craig Hamilton
Supervisor´s affiliation:	FNSPE

II. ASSESSMENT OF CRITERIA

Work assignment and topic motivation — **average**

Assess how demanding the assigned topic is. Brief introductory word on motivation for choosing the topic.

The work was to write a computer program that could calculate the output probabilities from a general set of Non-Gaussian states. This is a computationally demanding task that would require supercomputers to perform in reasonable time. GBS is also being widely explored by theoreticians and experimentalists, so expanding the range of states that can be used is important. This topic has a gentle introduction but there are significant areas of research that could have been tackled within.

Fulfilling the assignment — **fulfilled**

Consider whether the work submitted meets the assignment topic. Comment, if necessary, on items of the assignment not fully answered, or mention whether the scope of the assignment has been broadened. If student failed to fully treat the assigned topic, try to assess the importance, impact and/or the reasons for failings.

The student developed a good understanding of the subject and made progress developing his own program, which runs and produces sensible results. Results were checked with analytics where possible. The student understands the work and the limitations of the programs. The student was then tasked with exploring other areas of work and there was limited advancement here.

Student´s effort and independent approach to the topic solution — **average**

Assess whether student displayed constant effort while investigating the problem, whether they regularly consulted the issues and whether they attended consultations well prepared. Assess student´s creativity and independence.

The student made good progress in the first year of the project, culminating in functioning computer code. They were in regular contact with advisors and worked well on their own. Creativity was not clearly demonstrated in the project.

Professional standard — **average**

Give your opinion on the professional standard of the work, application of course knowledge, references, and data from student´s practice.

The professional standard was good and student used knowledge gained in relevant courses.

Level of formality and of the language used — **average**

Assess the use of scientific formalism, the typography and language of the work.

The thesis is well written and has no serious grammatical errors.

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Choice of references, citation correctness	**average**
Give your opinion on student´s effort in utilizing references in their investigation. Characterize the choice of references and say whether all relevant sources were utilized. Verify whether all resource facts were properly distinguished from student´s own findings and results, whether there was no breach of citation ethics, and whether all reference citations are complete and agree with the citation usage and standards.	
The student has read the most important references that are directly related to project.	

Further comments and assessment
Give your opinion on the quality of the main results obtained in the work, e.g. on the level of quality of theoretical results, or the applicability of the engineering and programming outputs of the solutions obtained, on publication activity, experimental skills, etc.
The program itself does not seem to be able to tackle large system sizes, which was one of the aims of the project.

III. OVERALL ASSESSMENT AND SUGGESTED GRADE

Summarize all aspects of the work most influential for the overall assessment. If adequate, write questions to be answered by student during the defence of their work before the board.

The student worked well in the first half of the project and demonstrated a good knowledge of the topic. In the second year the student used his program to generate results and tested them analytically, but little progress was made in other areas of the project.

Questions:

1. **Is you program able to handle larger system sizes? If not, what are the reasons for this?**
2. **What hardware was the program run on?**
3. **Why are squeezed state used in GBS instead of displaced states or thermal states?**
4. **Could the NG state generation protocol be applied to create 2-mode, 3mode, etc states?**
5. **Could analytical results for eq 4.6 be derived? i.e following a similar analysis of ref 31**

Suggested grade: **C - good.**

Date: 29.5.2024

Signature: