

## Jury Member Report – Doctor of Philosophy thesis.

**Name of Candidate:** Anton Putintsev

**PhD Program:** Physics

**Title of Thesis:** Ambient Polaritonics

**Supervisor:** Professor Pavlos Lagoudakis

**Co-supervisor:** Dr. Denis Sannikov

### Name of the Reviewer:

I confirm the absence of any conflict of interest  (Alternatively, Reviewer can formulate a possible conflict)	  <b>Date: 27-09-2022</b>
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*The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.*

*If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.*

### Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevance of the topic of dissertation work to its actual content
- The relevance of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art
- The relevance of the obtained results to applications (if applicable)
- The quality of publications

The summary of issues to be addressed before/during the thesis defense

The thesis authored by Mr Putintsev Anton contributes to the development of polaritonic systems that can operate at room temperature, and which are based on organic emitters to replace the inorganic semiconductor microcavity/quantum well systems that operate at cryogenic temperatures.

The thesis is divided into 6 chapters, including an introduction/background and a summary chapter. The actual work is contained in three chapters which are well organized, in logical order and reflect well the experimental and theoretical analysis that took place. My feeling is that the Conclusion/Outlook chapter is too brief and perhaps would benefit from further elaboration ,especially with respect to applications.

The thesis present a scheme that has the potential to improve the performance of organic microcavity systems, where polariton condensates occur at room temperature and provides a, primarily experimental, investigation of photon statistics that occur in polariton condensates that are observed in such systems. It shows in particular that in spite of the spatially fragmented nature of the observed condensates the intensity noise is relatively low indicating that such systems can therefore provide the basis for practical polaritonic applications at room temperature.

The candidate has published three papers on the subject, two as first author and one as co-author ion impactful international peer reviewed scientific journals, which underlines the novelty of the scientific contribution and fulfils the typical requirements for awarding a PhD.

The methodology is appropriate and sophisticated while the experimentally obtained results are of high quality. This is a well written thesis which indicates a deep understanding of the studied physical system and the underlying theory.

The text itself is not free from errors. I found that especially chapter 3 suffers from an infestation of typos which need to be corrected for clarity and the avoidance of confusion. Additionally, I found that the abstract is too vague and does not capture successfully the particulars of this work

#### Provisional Recommendation

*I recommend that the candidate should defend the thesis by means of a formal thesis defense*

*I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report*

*The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense*