

# Referee report for the habilitation thesis of Martin Plesch

The submitted thesis presents a sample of the candidate's research work, published in internationally recognized peer-review journals (except for the most recent work). The collection presents a solid and diversified set of important results in the field of quantum information. Although all theoretical in nature, the results attempt to push the possibilities of physically realizable quantum protocols, an issue that is becoming of increasing importance in the recent years, because of the great implementation obstacles that have hindered so far the development of quantum technologies. The candidate's work concentrates on the efficient use of quantum resource, going beyond the typical complexity-theory paradigm and developing results that can already be relevant for small-scale protocols. Since present-day experimental research is still faced with large restrictions in terms of the amount of quantum resources, careful optimization of the protocols is an essential tool for the development of the technology at this stage. In this perspective, the candidate's work provides a substantial contribution to the field.

The work is presented in a clear and systematic way, with additional material that helps putting the results in a broad, unified perspective. All the results are exposed in detail providing sufficient background and references to the relevant bibliography in the field, meeting the high standard of quality required at an international level.

Given the above considerations, I evaluate the submitted thesis positively.

THE REFEREE

FABIO COSTA