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Review of dissertation thesis

assoc. prof. **Pavel Pořízka**, Ph.D.

PhD applicant: Huang Zhou
Supervisor: Martin Smrž, Ph.D.
Thesis title: Wavefront Correction for Mid-IR Laser

PhD applicant, Huang Zhou, submitted an extensive manuscript of dissertation thesis with primary focus on the wavefront correction of Mid-IR laser pulses. The topic is of paramount interest, e.g., in the case of high-power lasers where a high-quality beam profile is necessary. The applicant proved that his concept could compensate the wavefront of the beam as demonstrated by a satisfactory estimate of the beam quality factor (M^2).
The thesis itself is well written and reads smoothly, the author proved that his English is on a high level. The intricate physical phenomena are well explained and meaningful. The experimental part is supported with theoretical background where the applicant shows strong knowledge. There are several minor typos, however, they are not obstructing the understanding of the text. My only objection concerns the Czech version of the abstract which seems to be very freely translated without any correction by a native speaker. Tables, figures, and other supporting content is graphically well done.
The thesis successfully reached its goals when providing sufficient evidence on the wavefront correction. The applicant made further effort in construction and implementation of the adaptive optics and tailoring unique MatLab software. Moreover, the applicant proved his skills and knowledge when assembling the disk laser on which he run all the experiments. This is a remarkable result. However, it is a pity that all this work was reflected in only two first-authored publications with impact factor (Q2 and Q3 journals).
To summarize my review, Mr. Zhou proved his knowledge in physics, especially laser engineering, and submitted manuscript is of high scientific merit with great application potential. Therefore, I support the defense of this work and recommend Mr. Zhou to reach the PhD degree.

Questions and suggestions:

1) The abstract needs extensive Czech correction. I suggest also translating conclusions to the Czech language as it may be beneficial for interested readers.
2) Custom-made system of adaptive optics was built for the purposes of this work. Was it also used for the correction of beams from other laser sources? For instance, correcting the wavefront of a laser beam that was degraded artificially prior to the analysis.
3) In the work, the Gaussian beam profile is of primary interest. Is it possible to construct other wavefront profiles, for instance supergauss/flat-top or rectangular shape spots? This might bring another application potential of the AO device.

Brno, 4.1.2023

assoc. prof. Pavel Pořízka, Ph.D.