

Lasing Reporting Summary

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► Experimental design

Please check: are the following details reported in the manuscript?

1. Threshold

Plots of device output power versus pump power over a wide range of values indicating a clear threshold

Yes
 No

2. Linewidth narrowing

Plots of spectral power density for the emission at pump powers below, around, and above the lasing threshold, indicating a clear linewidth narrowing at threshold

Yes
 No

Resolution of the spectrometer used to make spectral measurements

Yes
 No

The laser used in this study is a commercially available device. we have written the detailed information of this commercially available laser in the experimental setup. Therefore, the following details are not reported in the manuscript: threshold, linewidth, coherent emission, beam spatial profile, operating conditions, theoretical analysis and statistics, etc.

3. Coherent emission

Measurements of the coherence and/or polarization of the emission

Yes
 No

4. Beam spatial profile

Image and/or measurement of the spatial shape and profile of the emission, showing a well-defined beam above threshold

Yes
 No

5. Operating conditions

Description of the laser and pumping conditions
Continuous-wave, pulsed, temperature of operation

Yes
 No

Threshold values provided as density values (e.g. W cm⁻² or J cm⁻²) taking into account the area of the device

Yes
 No

6. Alternative explanations

Reasoning as to why alternative explanations have been ruled out as responsible for the emission characteristics
e.g. amplified spontaneous, directional scattering; modification of fluorescence spectrum by the cavity

Yes
 No

7. Theoretical analysis

Theoretical analysis that ensures that the experimental values measured are realistic and reasonable
e.g. laser threshold, linewidth, cavity gain-loss, efficiency

Yes
 No

8. Statistics

Number of devices fabricated and tested

Yes
 No

Statistical analysis of the device performance and lifetime (time to failure)

Yes
 No

