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Title: High-power Self-mode-locked Pr:YLF Visible Lasers

1: Information on the pump source and beam shaping is missing.

- What is the M^2 of the diode lasers? Blue laser diodes are knows for asymmetrical beam qualities.
- What is the beam size in the crystal? You state, that “the average pump size is 65 µm”. Is that the diameter or the radius? Is it averaged over the crystal length? If so, did you take the exponential absorption into account (=effective beam diameter)? As the beam quality of the diode in the both directions is different, both sizes should be given.
- Did you vary the pump power with the current alone? As the beam quality and the emission wavelength strongly depend on the current, overlap of pumped crystal volume and resonator mode as well as absorption vary with your stated pump power. Did you measure the absorption for each current?
- Why should the pumping volume increase when adding the second pump laser? When it is properly aligned, the pumping volumes should overlap. Only in case of misalignment the pumping volume increases (and the transversal mode of the laser should increase as well). Increasing the pump power by using the same current for both diode lasers would lead to results that are easier to compare and analyse.

2: Different order in description of setup:

- The information on the Pr:YLF-crystal should be positioned directly behind the information on the pump lasers because they are strongly connected.

3: Missing information on Mirrors:

- The pump mirrors IM1&2 are plane, aren’t they?
- What about the transmission @698 and 720 nm (stronger emission compared to 523 nm) of IM1&2 mirror in the green laser?
- What are the angles of incidence on the curved mirrors and is astigmatism a problem?

4: Missing information on spatial properties of the laser

- What does the beam profile look like (maybe at different points of a caustic (e.g. near- and far-field)?
- What is the beam quality in both direction at different points of the power curve? I would bet that it changes when the second pump laser is added.

5: Spectrum of the laser:

- When determining the spectral width with FWHM, there should be a fitting curve on the measured data. By using the very small but high peak (could be an artifact) as the maximum of the spectrum the determined width is to narrow.

6: Mode locking operation:

- At which pumping power does the mode locking operation occur? Does it change with increasing pumping power?
- The pulse duration would be a very interesting parameter of your laser. Can you measure it?
- Why do you think, that the mode locking occurs due to the kerr effect? In your Ref. [8] it is shown/calculated that it is very unlikely that Pr:YLF as a medium with a low nonlinear refractive index is suitable to archive mode locking. Please give some reasons and discuss your assumption.

Minor misspellings:

- “HR1~HR3” instead of “HR1-HR3”
- “slop” instead of “slope”
- “Fig. 3 (c)” instead of “Fig. 5 (c)”

References:

- The average power, described in [1], is several 100 W and therefore out of reach for the laser you suggest. Please find a more relevant application for example in bio analysis.
- The effect that is described in [10] does not work in solid state gain media without GVD compensation, as it is stated in the paper itself. Therefore I don’t think that this reference is relevant for your work.
- You do not use your Ref. [9] somewhere in the text. Why is the SLM operation of Pr:YLF laser relevant in your work?