

1 General comment

Review of the manuscript “On the temperature stability requirements of free-running Nd:YAG lasers for atmospheric temperature profiling through the rotational Raman technique”, by José Alex Zenteno-Hernández, Adolfo Comerón, Federico Dios, Alejandro Rodríguez-Gómez, Constantino Muñoz-Porcar, Michaël Sicard, Noemi Franco, Andreas Behrendt, Paolo Di Girolamo.

The presented study provides quantitative numbers about the uncertainty in the calculated temperature as a result of a Gaussian widening of the emitted line and the resulting impact on the detected high and low number lines and their ratio Q . It also simulates the effect of a drift in the central emitted line assessing the impact on the power ratio Q . The assessment is done for a free running Nd:YAG laser (unseeded) with respect to a seeded laser and shows that the overall uncertainty due to the changing temperature of the rod can be kept around 1K.

2 Specific comments

The manuscript provides a lean, concise, but clear technical description of the uncertainty sources related to the instability of key parameters of the emission laser. It is probably more of a technical note than a scientific paper, but I believe that many authors working in the Raman lidar field and retrieving the temperature from the PRR spectrum will benefit from this article when calculating their global error budget.

3 Technical corrections

The overall quality of the graphics should be improved, especially Fig.2-7 something is always missing or not properly shown. The list of detailed comments is given here:

- Page 1 Line 22 add a space before the bracket.
- Page 1 line 28: “the backscatter cross section **corresponding to** the Raman lines...”
- Page 2 Line 41: do the author mean the thermal coefficient of the interference filter? Shouldn't be "ppm/°C"?
- Page 2 Line 47-50: something is missing, please check and consider rephrasing this paragraph.
- Line 65 and 67: remove brackets from Hammann's citation.
- all over through the text: replace atmosphere temperature with atmospheric temperature.

- Figures 2 and 3 are not very useful in the way they are shown. A plot showing the difference-curve of "widened-unwidened", in y-log scale and with a legend would surely help.
- Line 96: in spite of.
- Line 112 (and all over through the text): remove brackets around the authors' names.