Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2018-389-RC3, 2019

Atmospheric Measurement Techniques Discussions

Interactive comment on "Laser frequency stabilization based on an universal sub-Doppler NICE-OHMS instrumentation for the potential application in atmospheric Lidar" *by* Y. Zhou et al.

Anonymous Referee #3

Received and published: 15 February 2019

The manuscript tilted by "Laser frequency stabilization based on an universal sub-Doppler NICE-OHMS instrumentation for the potential application in atmospheric Lidar" made a frequency stabilized laser based on cavity enhanced optical heterodyne molecular spectroscopy named as NICE-OHMS.

The text line of 30 in the page 5 is as following: "The performance of the frequency stabilization were assessed by Allan plot of the frequency deviation estimated from the error signals, i.e. the sD NICE-OHMS signals, calibrated by the slopes at the zero crossing point of the sD signals."

Analysis of servo error signal is not right way to characterize the performance of fre-

quency stabilized laser. The electronic servo box can drive the laser frequency to make error signal at the zero-crossing point of the sD signals. Fig.3 shows the baseline of sD signals (blue line) is moving around the zero-crossing point. The servo box adjusted the laser frequency to make error signal at the zero-crossing point, therefore the laser frequency is unstable. So I hope the authors to make two independent frequency stabilized lasers and make analysis of the beating signal between two lasers to characterize the performance of frequency stabilized laser.

The performance of stabilized laser is dependent on the length of cavity, pressure of cell, input light power to the cavity, beam size inside of the cavity, cell temperature instability, the cavity output light power and the RAM in the sD signal. So the authors need to add analysis and optimization for the parameters which affect the frequency instability of the stabilized lasers.

The manuscript needs to be modified before publication.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-389, 2018.