Comment on amt-2021-357

Anonymous Referee #2

Referee comment on "Spectral performance analysis of the Aeolus Fabry–Pérot and Fizeau interferometers during the first years of operation" by Benjamin Witschas et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-357-RC2, 2022

This article analyzes the doppler frequency discrimination performance of the ALADIN. The detailed description is helpful and insightful. It makes a big contribution to the design and construction of spaceborne Doppler lidar receiver. The suggestions of this article are listed as bellow:

1.The optical frequency discrimination performance of Doppler lidar seriously affects the accuracy of wind speed measurement. This paper does not mention how the frequency discrimination performance affects the measurement accuracy with the system operation.

2.This paper mentioned that the frequency discrimination performance of Doppler lidar is mainly caused by the alignment stability and the laser quality. In my experience, the performance of the detector also affects the efficiency of photoelectric conversion, especially for ACCD.

3.Why don't chose PMT detectors in this system, and apply FPI for Doppler frequency discrimination of Mie doppler signals?

4.How to normalize the long-term FPI transmission curves, in the line 380 and why the direct channel normalization forms of Fig. 5(a) and Fig. 5(b) are inconsistent?

5.The beam divergence angle of the incident FPI has a serious impact on the transmittance of the FPI in line 570. The larger divergence angle corresponds to the greater FWHM and the lower transmittance of the FPI. According to the optical path setting in Fig. 1, only one collimating mirror is used to collimate the received signal light. The signal light is reflected by the Fizeau interferometer and then enters the direct channel of the FPI. The reflected light of the direct channel enters the reflection channel of

the FPI, and the optical path is too long. How to ensure the incident FPI with minimal divergence angle.

6.In line 135, 20 laser pulses for each measurement are used, while 190 pulses is used in 145 line, please explain it clearly.

7.Lines 155-190 describe the process of laser energy drift correction. For the reader's convenience, a simple system schematic diagram including optical and electrical devices is recommended.

8.Line 330, "in the top panel (a)" may refer to "in the top panel of Fig. 4 (a)", and line 365 "in the bottom panel (b)" may refer to "in the bottom panel of Fig. 4 (a)".