

# 802.3aq LRM Draft 3.1 Need for split-sym stressor

**Comments 2-3-4-11 [Dawe]; 29-30 [Cunningham]**

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802.3aq LRM meeting

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# Summary

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1. Statistics of split pulses in measured DMDs
2. Statistics of offset from Rayleigh distribution (causing split pulses in installed fibers with actual center launches)
3. Split pulses seen in 1GbE work –reason for offset patch cord.
4. Seen in J. King work on polarization effects; seen in Georgia Tech/OFS work on polarization effects

## Statistics of two peak cases HAVE been presented

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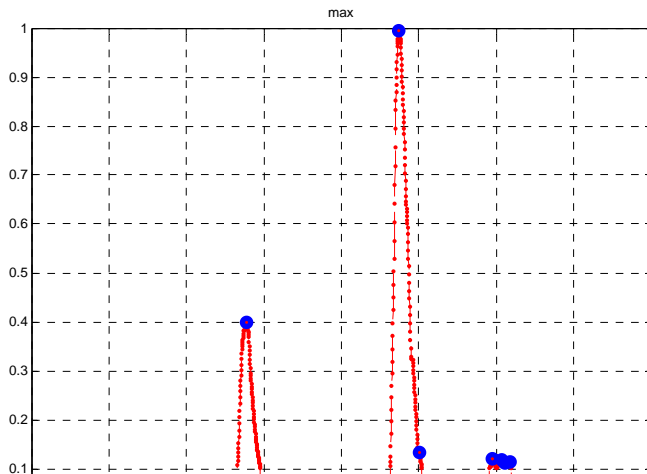
Corning, OFS, Systimax have supplied data starting in July 2004.....

abbott\_1\_0305.pdf, abbot\_2\_0305.pdf, and abbot\_2\_0106.pdf relate directly to two peak cases.

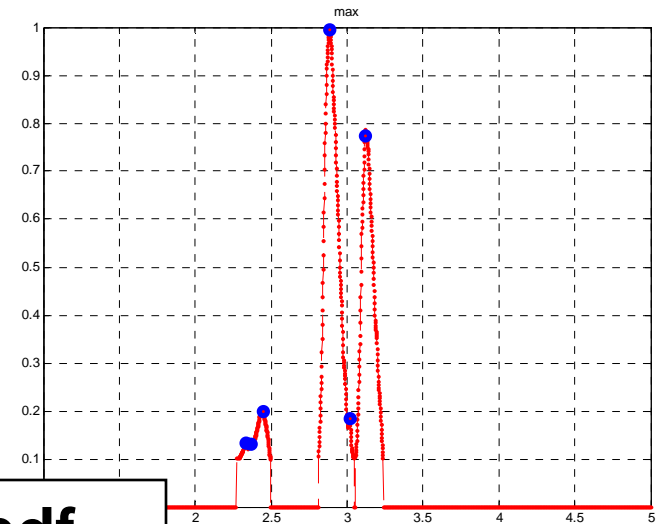
abbott\_2\_0305.pdf ----

slide 19 gives probability distribution of peak heights for 0um offset from a set of 1806 historical measured DMDs; slide 23 gives the distribution of offset BW for 0,2,4um. These show that two peak cases certainly occur.

# Examples of peak finding in DMD pulse data



0um launch

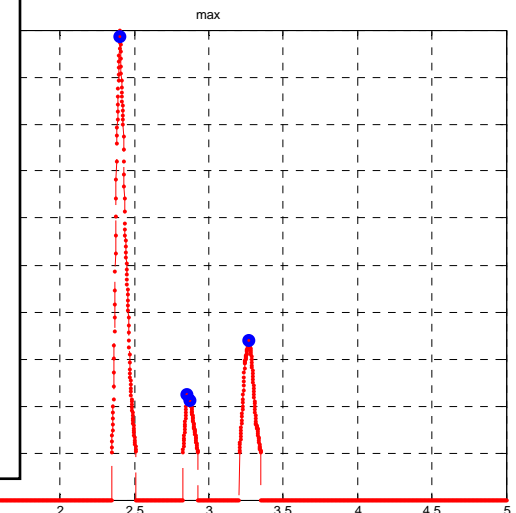
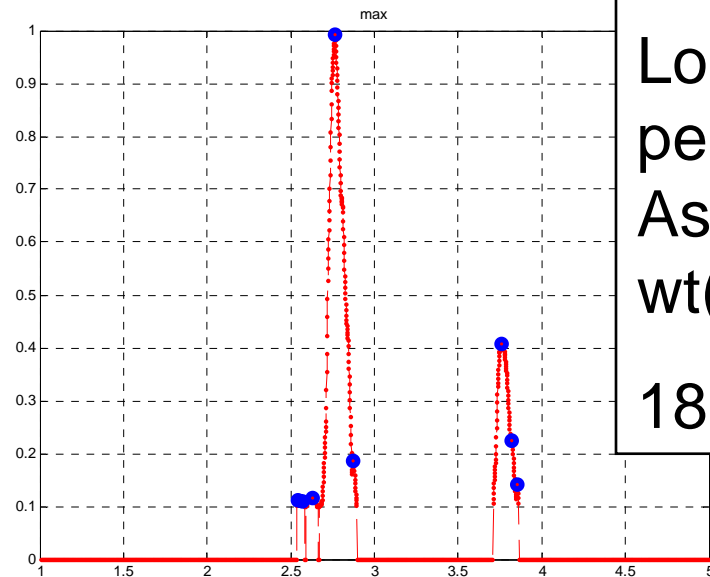


**abbott\_2\_0305.pdf**

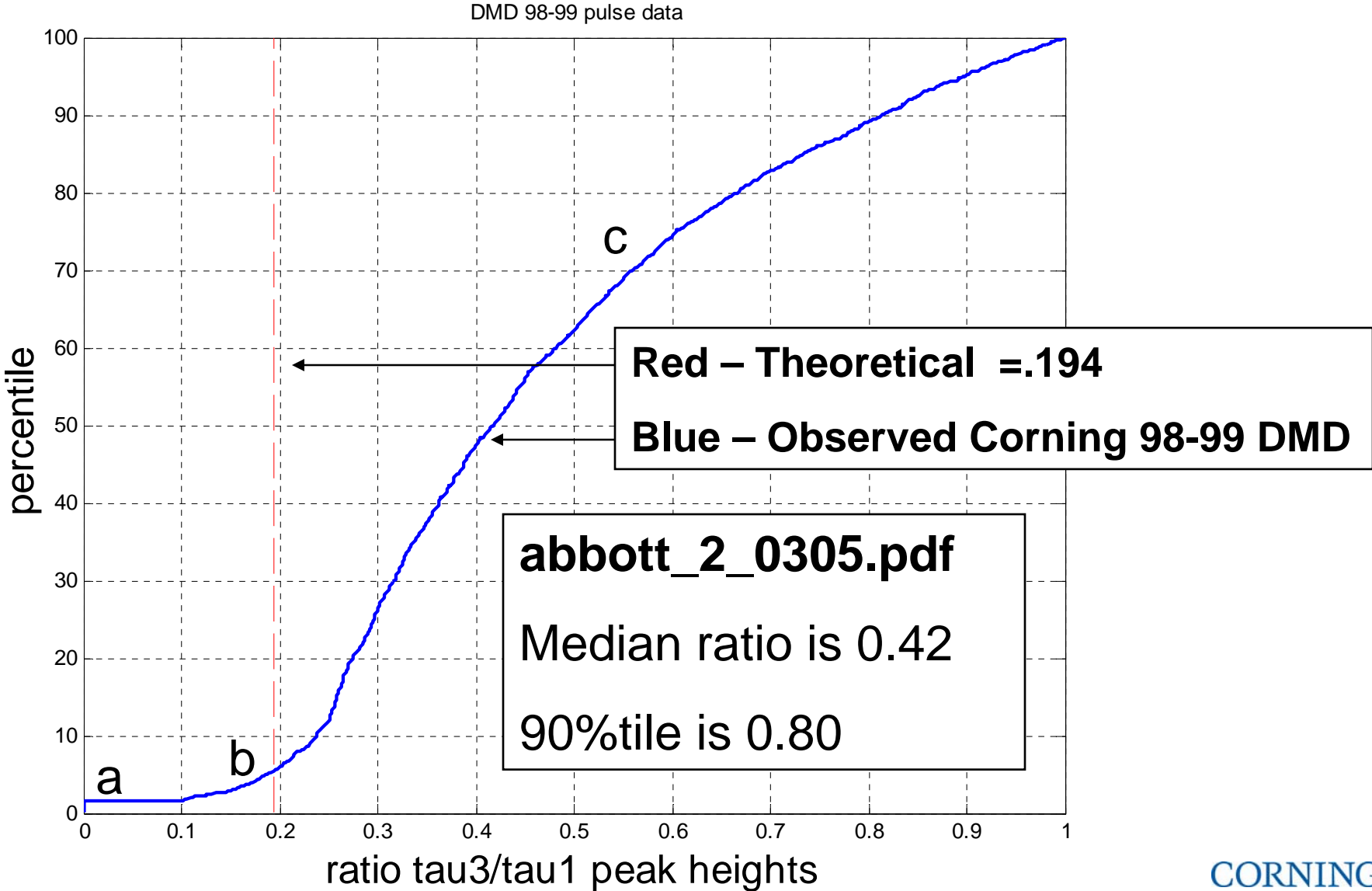
Look at ratio of max  
peak to 2<sup>nd</sup> largest.

Assume this =  
 $wt(\tau_1)/wt(\tau_3)$

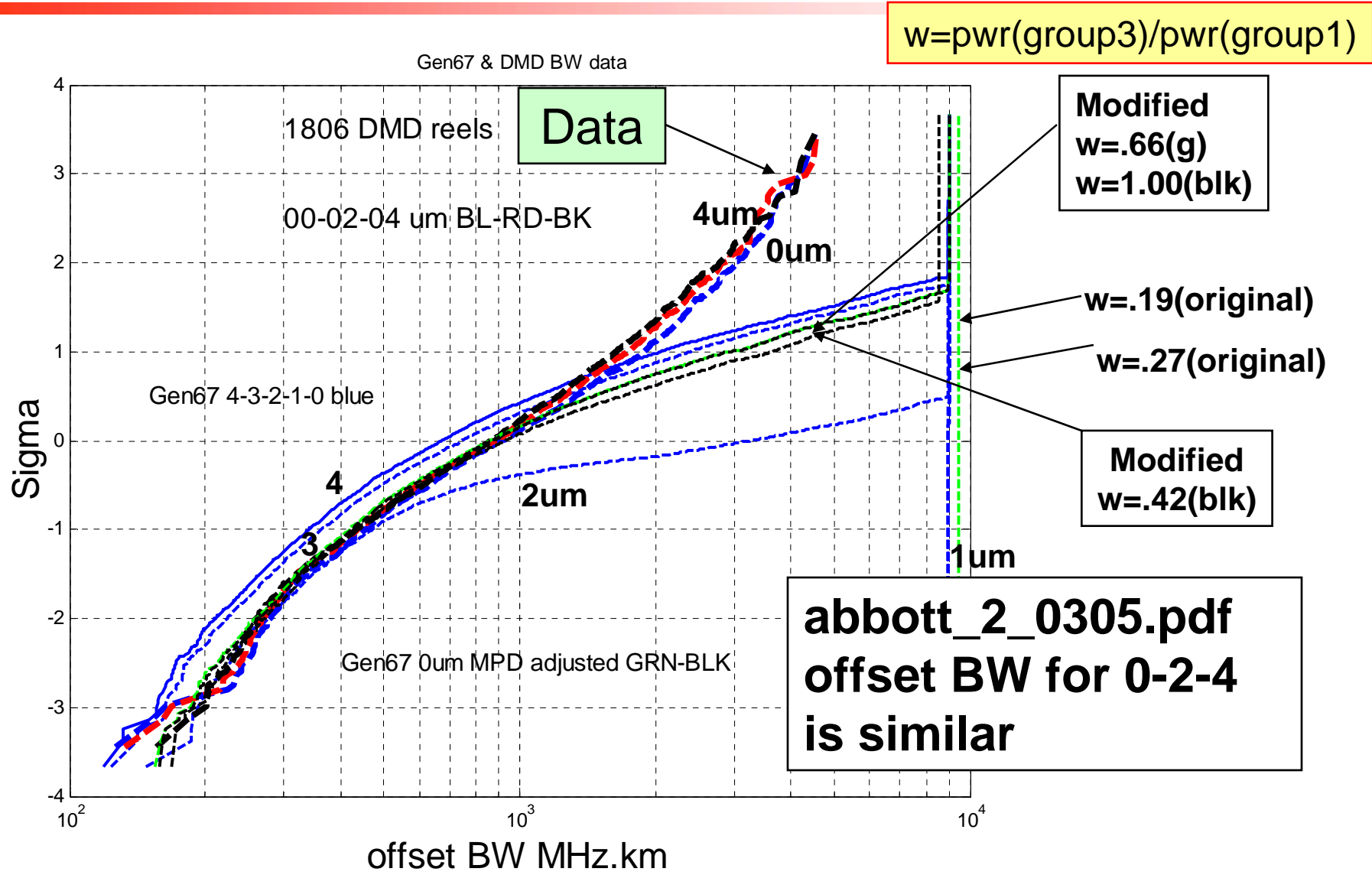
1806 measured reels



# Ratio of peak heights: tau3 to tau1



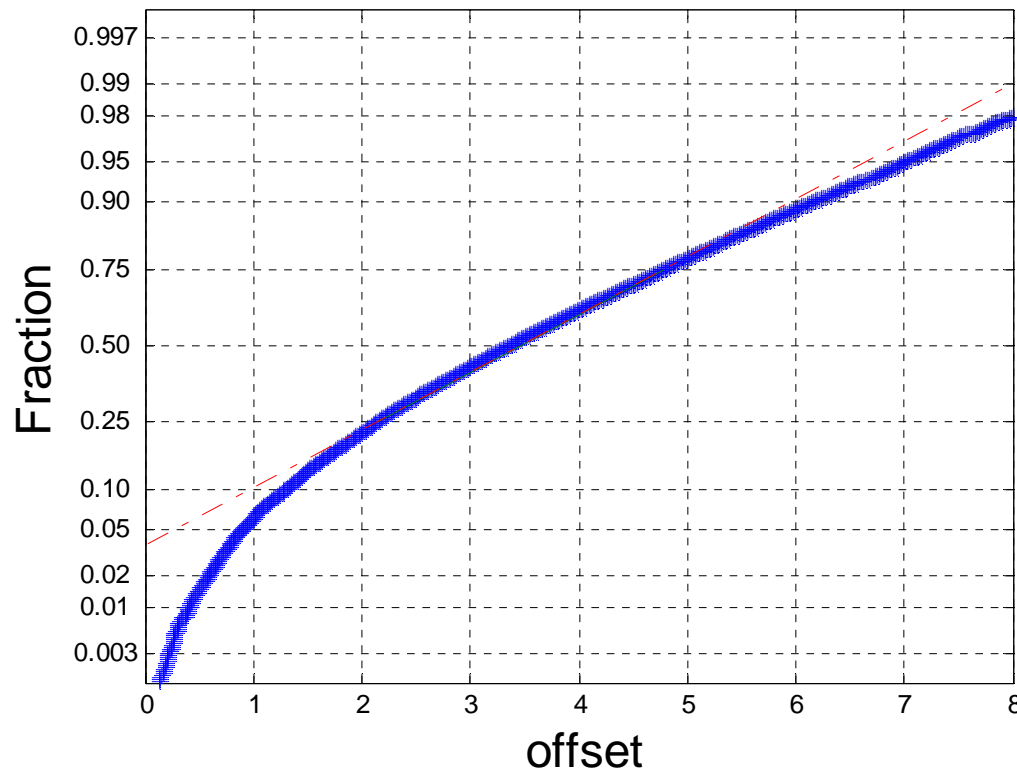
# Offset BW distributions for 0-4um offsets



# Statistics of actual launches gives split pulses

The offset of the laser launch is best described by a Rayleigh distribution similar to that of MM connectors (mean=3.58 $\mu$ m). See Pepeljugoski et al. JLT May 2003 p.1256 (modeling for 10GbE 50 $\mu$ m 850nm)

Rayleigh Distrib



More than 50% of launches >3.5 $\mu$ m;  
0-1 $\mu$ m launches are expected to be relatively rare.

This leads to split pulses.

# 1 GbE experience – split pulses exist

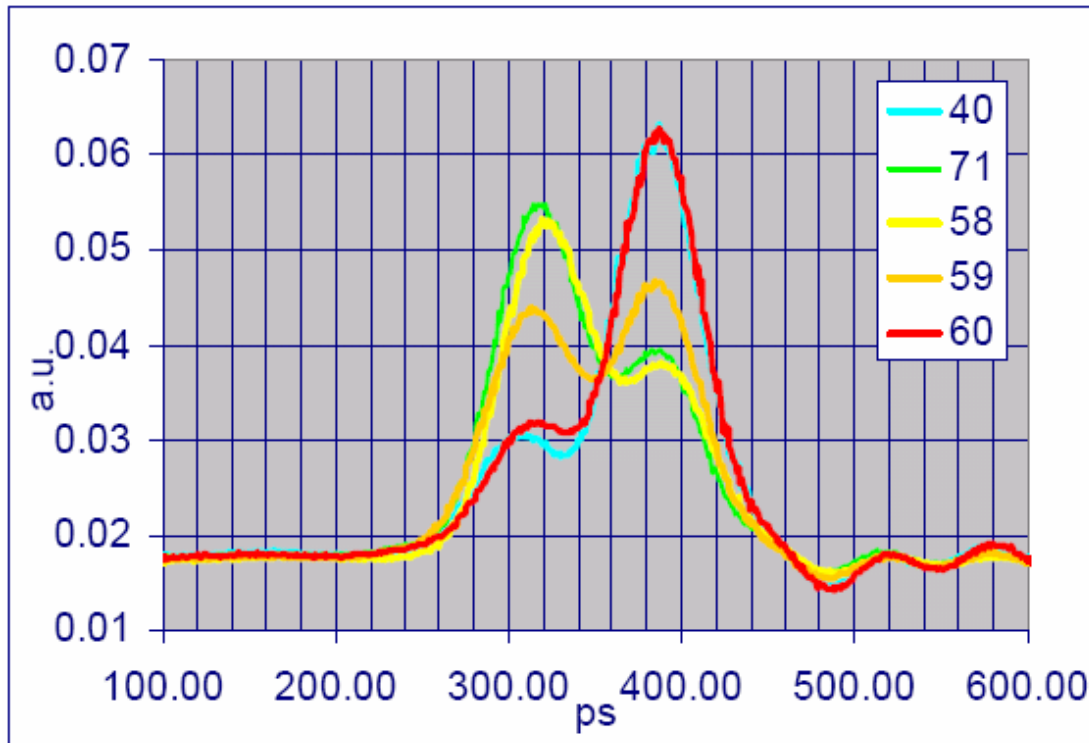
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The reason for the offset patch cord is the existence of split pulses as seen in the 802.3z work.

The issue has been studied both theoretically with modeling and well as experimentally and is generally accepted.



# Split pulse (king\_2\_1104.pdf)



King results are consistent with the abbott\_2\_0305.pdf DMD data.