It can be shown that the phase difference between two consecutive measurements is given by

$$\Delta\phi = \cos^2\phi_i \left[\frac{Q_{i+1}}{I_{i+1}} - \frac{Q_i}{I_i} \right]$$

If we assume that the FMZI is initially well aligned, I.e., $\cos\phi_i \approx 1$ or $I_{i+1} \approx I_i \approx I_{\max}$, where $I_{\max}$ is the maximum I output of the FMZI, then the phase difference can be written as

$$\Delta\phi \approx \frac{Q_{i+1} - Q_i}{I_{\max}}$$

If $n-$bit A/D converters are used in the data analysis, the minimum phase difference which can be measured in the FMZI is

$$(\Delta\phi)_{\min} \approx \frac{Q_{\max}/2^n}{I_{\max}} \approx \frac{1}{2^n}$$

Since we 16-bit A/D-converter was used in our measurement,

$$(\Delta\phi)_{\min} = \frac{1}{2^{16}} \approx 1.53 \times 10^{-5}$$