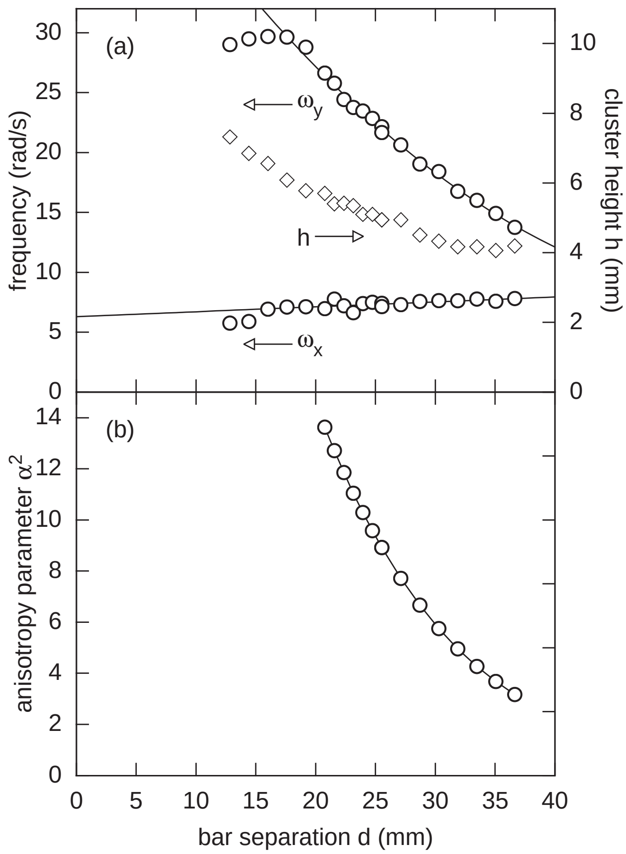

Figure 3: (a) Dependence of measured c.m. frequencies ω_x and ω_y and the height h of the cluster above the top of the well on the width d. Here ω_x is fitted with a linear function and ω_y with a quadratic curve. (b) Dependence of the smoothed anisotropy parameter $\alpha^2 = \omega_y^2/\omega_x^2$ on d.

fluctuations or small periodic perturbations can cause the system to flip between the two zigzag states, as was observed. For the next lower value of α^2 flipping was not seen, indicating that the potential barrier between the two degenerate zigzag states was then too high.

Theoretical configurations which can be compared to the experiment are found by minimizing Eq. (5), allowing us to predict $x_{rms} = r_0\xi_{rms}$ and $y_{rms} = r_0\eta_{rms}$ as a function of α^2. To calculate a configuration three parameters, α^2, κ and n, are required. We know n, and α^2 has been measured, so we only need to determine the shielding parameter κ. To do this we assume that κ is independent of α^2 and then minimize the sum of the squared differences between the measured and computed values of y_{rms}, giving $\kappa = 2.4$ and $r_0 = 1.25$ mm. The Debye length $\lambda_D = r_0/\kappa = 0.52$ mm is comparable to the inter-particle distance and the average charge $q = -1.2 \times 10^4 e$. These values are consistent with those found in previous experiments for similar plasma conditions [8, 12, 16, 18, 19].