ϵ_r =0.0, J=0.64, g=10 $\times 10^9$ 0.0016 N = 81.2 N = 100.0014N = 111.0 N = 120.0012 $\begin{array}{c} \text{FFT} \left[\left\langle \hat{\sigma}_i^z \right\rangle \right] \\ \text{9.0} \\ \end{array}$ 0.0010 $\delta\Omega_{beat}$ 8000.0 beat 0.00060.40.00040.2 0.00020.0 0.0000 0.2 0.40.6 0.8 1.0 10 11 12 0.0 Ω/ω N