

$$P_s = |\Psi_{N1}(\tilde{Z}|\Psi_{N1}(\tilde{Z}-\epsilon)\rangle|^2 = 1 - \frac{33\epsilon^2}{4\tilde{Z}^2}\left\{1 + \mathcal{O}\left[\epsilon, 1/\tilde{Z}\right]\right\}$$