$$H_{int} = \Delta(n_j - 0.5)(n_{j+1} - 0.5)$$

Left panel: $|J|/J_0$ versus E, with curves labeled F (red) and R (blue).

Right panel: $R = -J_f/J_r$ versus E, with Peaks marked at $E = 2.17$, $E = 3.68$, and $E = 9.95$.