$$\chi_{\mathrm{PJ}}(\omega=0) = \begin{array}{c} \Psi_{\mathrm{a}}^{\dagger} & \Psi_{\mathrm{b}} \\ \Psi_{\mathrm{a}} & \Psi_{\mathrm{b}} \end{array} + \begin{array}{c} \Psi_{\mathrm{b}}^{\dagger} & \Psi_{\mathrm{b}} \\ \Psi_{\mathrm{b}} & \Psi_{\mathrm{b}} \end{array}$$