$$\mathbf{H}'' \quad : \quad \begin{matrix} \\ \alpha\to\beta \\ \beta\to\alpha \\ \alpha\to\beta \\ \beta\to\alpha \end{matrix} \begin{bmatrix} \overset{2}{\mathbf{A}''} & \overset{\beta\to\alpha}{\mathbf{B}''} \\ (\mathbf{B}'')^* & (\mathbf{A}'')^* \end{bmatrix}$$

$$\mathbf{A}'' \quad : \quad \begin{matrix} \\ \alpha\to\beta \\ \beta\to\alpha \end{matrix} \begin{bmatrix} \overset{\alpha\to\beta}{\mathbf{X}} & \overset{\beta\to\alpha}{\mathbf{0}} \\ \mathbf{0} & \mathbf{X} \end{bmatrix}$$

$$\mathbf{B}'' \quad : \quad \begin{matrix} \\ \alpha\to\beta \\ \beta\to\alpha \end{matrix} \begin{bmatrix} \overset{\alpha\to\beta}{\mathbf{0}} & \overset{\beta\to\alpha}{\mathbf{X}} \\ \mathbf{X} & \mathbf{0} \end{bmatrix}$$

$$\mathbf{H}'' \quad = \quad \begin{matrix} \\ \alpha\to\alpha \\ \alpha\to\beta \\ \beta\to\alpha \\ \beta\to\beta \\ \alpha\to\alpha \\ \alpha\to\beta \\ \beta\to\alpha \\ \beta\to\beta \end{matrix} \begin{bmatrix} \overset{\alpha\to\alpha}{(\epsilon_a - \epsilon_e)} & \overset{\alpha\to\beta}{0} & \overset{\beta\to\alpha}{0} & \overset{\beta\to\beta}{} & \overset{\alpha\to\alpha}{\langle ab||ij\rangle} & \overset{\alpha\to\beta}{0} & \overset{\beta\to\alpha}{0} & \overset{\beta\to\beta}{\langle ab|ij\rangle} \\ 0 & (\epsilon_a - \epsilon_e) - & 0 & & \langle ab||ij\rangle & 0 & 0 & \langle ab|ij\rangle \\ 0 & 0 & 0 & & \langle ab||ij\rangle & 0 & 0 & \langle ab|ij\rangle \\ * & 0 & 0 & & \langle ab||ij\rangle & 0 & 0 & \langle ab|ij\rangle \\ \langle ab||ij\rangle^* & 0 & 0 & & \langle ab||ij\rangle & 0 & 0 & \langle ab|ij\rangle \\ 0 & 0 & 0 & & \langle ab||ij\rangle & 0 & 0 & \langle ab|ij\rangle \\ 0 & 0 & 0 & & \langle ab||ij\rangle & 0 & 0 & \langle ab|ij\rangle \\ \langle ab|ji\rangle^* & 0 & 0 & & \langle ab||ij\rangle & 0 & 0 & \langle ab|ij\rangle \end{bmatrix}$$