$$H_{122} = \begin{bmatrix} 2\,h-6\,\mu+U & -\left(\frac{t}{\sqrt{3}}\right) & 0 & \sqrt{2}\,t & 0 & 0 & 0 & 0 & -2\,\sqrt{\frac{2}{3}}\,t & 0 \\ -\left(\frac{t}{\sqrt{3}}\right) & 2\,h-6\,\mu+U & 0 & 0 & \sqrt{6}\,t & -\left(\sqrt{3}\,t\right) & 0 & \frac{4\,t}{\sqrt{3}} & 0 & -\left(\sqrt{3}\,t\right) \\ 0 & 0 & 2\,h-6\,\mu+2\,U & 0 & 2\,\sqrt{2}\,t & 0 & 0 & 0 & 0 & -2\,t \\ \sqrt{2}\,t & 0 & 0 & 2\,h-6\,\mu+2\,U & -2\,t & 0 & 0 & -\left(\sqrt{2}\,t\right) & 0 & \sqrt{2}\,t \\ 0 & \sqrt{6}\,t & 2\,\sqrt{2}\,t & -2\,t & 2\,h-6\,\mu+2\,U & 0 & 0 & 0 & 0 & 0 \\ 0 & -\left(\sqrt{3}\,t\right) & 0 & 0 & 0 & 2\,h-6\,\mu+2\,U & \sqrt{2}\,t & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \sqrt{2}\,t & 2\,h-6\,\mu+2\,U & -\left(\sqrt{2}\,t\right) & 0 & 0 \\ 0 & \frac{4\,t}{\sqrt{3}} & 0 & -\left(\sqrt{2}\,t\right) & 0 & 0 & -\left(\sqrt{2}\,t\right) & 2\,h-6\,\mu+U & 2\,\sqrt{\frac{2}{3}}\,t & 0 \\ -2\,\sqrt{\frac{2}{3}}\,t & 0 & 0 & 0 & 0 & 0 & 0 & 2\,\sqrt{\frac{2}{3}}\,t & 2\,h-6\,\mu+U & 0 \\ 0 & -\left(\sqrt{3}\,t\right) & -2\,t & \sqrt{2}\,t & 0 & 0 & 0 & 0 & 0 & 2\,h-6\,\mu+U \end{bmatrix}$$