Figure 4: Critical manifolds for $g_{SI} = 0.5615$ mS/cm² projected onto $(h_{SI}, m_{SO}, V)$-space of the fast subsystem of (1), where the slow variables $m_{SO}$ and $h_{SI}$ are treated as parameters; panels (a) and (b) show two different viewpoints of the surfaces of equilibria, coloured black when stable and red when not; from the same viewpoints, panels (c) and (d) also show maxima and minima with respect to $V$ of the two-parameter families of periodic orbits, coloured blue when stable and magenta when not. The equilibrium manifold splits into six sheets labelled $S_{1}^{a}$, $S_{1}^{r}$, $S_{2}^{a}$, $S_{2}^{r}$, $S_{3}^{a}$, and $S_{3}^{r}$, that are separated by four fold curves $F_{0}$ (not shown), $F_{1}$, $F_{2}$, and $F_{3}$, and a curve of Hopf bifurcations labelled $H$; the saddle and attracting families of periodic orbits are labelled $P^{r}$ and $P^{a}$, respectively.

The geometry of $S$ and $P$ depends on the values of the other parameters in the system, such as the conductance $g_{SI}$. In order to illustrate the spike generation, we consider the fast subsystem