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Hilbert modular varieties arise from the discrete action of a group $\mathrm{PSL}_2(R)$ on a product of hyperbolic planes, where R is the ring of integers of a totally real number field. We investigate a generalization of this to the discrete action of a group $\mathrm{PSL}_2(\mathcal{O})$ on a product of hyperbolic 4-spaces, where \mathcal{O} is an order in a definite quaternion algebra over a totally real number field. We observe some topological properties of the resulting orbifolds via some examples. (Received March 09, 2017)