A well-studied object in combinatorial optimization is the perfect matching polytope $\mathcal{PMP}(G)$ of a graph $G$. A graph $G$ is ‘Birkhoff–von Neumann’ if $\mathcal{PMP}(G)$ is characterized solely by non-negativity and degree constraints, and $G$ is ‘PM-compact’ if the combinatorial diameter of $\mathcal{PMP}(G)$ equals one. Each of the corresponding decision problems has a graph-theoretical co-$\mathcal{NP}$ characterization; there is a striking similarity between these characterizations. However, neither of them is known to be in $\mathcal{NP}$. We give a complete characterization of graphs that are Birkhoff–von Neumann as well as PM-compact. Joint work with Nishad Kothari, Xiumei Wang and Yixun Lin (see https://arxiv.org/abs/1807.07339).