Compact spaces with a $\mathbb{P}$-diagonal

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A space has a $\mathbb{P}$-diagonal if the complement of its diagonal in its square has a cover $\{K_f : f \in \mathbb{P}\}$ by compact sets with the property that $f \leq g$ implies $K_f \subseteq K_g$. (The letter $\mathbb{P}$ denotes the set of functions from ω to ω.)

We prove that every compact space with a $\mathbb{P}$-diagonal is metrizable and along the way we prove a Baire category type result for the Cantor cube 2^{ω_1} and covers as above.

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