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Graph Sandwich Problems and Graphs Partition Poblems: how do they relate?

In this talk we consider two decision problems. The first one is the Golumbic, Kaplan and Shamir decision sandwich problem for the property Π, where two graphs $G^1 = (V, E^1)$ and $G^2 = (V, E^2)$ are given, such that $E^1 \subseteq E^2$, plus the question whether there exists a graph $G = (V, E)$, such that $E^1 \subseteq E \subseteq E^2$, and G satisfies property Π. The second one is the Feder, Hell, Klein and Motwani decision graph partition problem, where it is given a graph G and the question whether there is a partition for the vertex set V of G into at most k sets $V_1, V_2, \ldots, V_k$, which can have inner properties (like V_i being a clique, or an independent set, or no restriction) and external properties (like V_iV_j being completely adjacent, or completely non-adjacent, or no restriction).

We will discuss the complexity of the sandwich problem for properties or classes of graphs arising from partition problems.