Universality of graphs modelling massive networks

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A (countable) graph G is said to be *locally existentially closed* if, for any vertex $x \in G$, a subset of vertices $S \subseteq N(x)$, and another subset $T \subseteq V(G) - (S \cup \{x\})$, there exists a vertex y not in $S \cup T \cup \{x\}$ such that y is joined to all vertices in S and to no vertex from T. Starting with any countable graph H, one can construct a locally existentially complete graph R_H, which is a minimal existentially complete graph containing H. Such a graph is also a countable limit (in the Fraïssé sense) of the class of all countable H-colourable graphs.

In this talk, we will show that the lattice of ideals of $End(R_H)$ embeds $\mathcal{P}(\omega)$ and that the monoid $End(R_H)$ itself is universal for the class of all countable monoids.

The talk is based on a joint work with A. Bonato.