Hybrid networks, i.e., networks that leverage different means of communication, become ever more widespread.

To allow theoretical study of such networks, [Augustine et al., SODA'20] introduced the HYBRID model, which is based on the concept of synchronous message passing and uses two fundamentally different principles of communication: a local mode, which allows every node to exchange one message per round with any neighbor in a local communication graph; and a global mode where any pair of nodes can exchange messages, but only few such exchanges can take place per round.

A sizable portion of the previous research for the HYBRID model revolves around computing distances of shortest paths. In this paper, we study a related problem class, namely computing compact, near-shortest path routing schemes for the local communication graph. We demonstrate that, for the case where the local communication graph is a unit-disc graph with n nodes that has no radio-holes, we can deterministically compute a routing scheme that has constant stretch and uses labels and local routing tables of size only O(log n) bits in just O(log n) rounds.

While we provide a high level description for the overall routing scheme, the focus of this talk is on the construction of an exact routing scheme for the grid graph that represents the unit-disc graph.