

## **Adaptive interference avoidance and mode selection scheme for D2D-enabled small cells in 5G-IloT networks**

**IEEE Transactions on Industrial Informatics**

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Small cell (SC) and device-to-device (D2D) communications can fulfill high-speed wireless communication in indoor industrial Internet-of-Things (IloT) services and cell-edge devices. However, controlling interference is crucial for optimizing resource sharing (RS). To address this, we present an adaptive interference avoidance and mode selection (MS) framework that incorporates MS, channel gain factor (CGF), and power-allocation (PA) techniques to reduce reuse interference and increase the data rate of IloT applications for 5G D2D-enabled SC networks. Our proposed approach employs a two-phase RS algorithm that minimizes the system's computational complexity while maximizing the network sum rate. First, we adaptively determine the D2D user mode for each cell based on the D2D pair channel gain ratios of the cellular and reuse mode. We compute the CGF for each cell with a D2D pair in reuse mode (RM) to select the reuse partner. Then we determine the optimal distributed power for the D2D users and IoT-user equipment using the Lagrangian dual decomposition method to maximize the network sum rate while limiting the interference power. The simulation results indicate that our proposed approach can maximize system throughput and signal-to-interference plus noise ratio, reducing signaling overhead compared to other algorithms.