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J4PL1: Cryogenic infrastructure for 400 qubits and beyond

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IBM announced the fabrication and initial characterization of its 433 qubit Osprey processor in late 2022, and released it to clients in 2023. Osprey required several advances to yield a payload nearly 4x larger than its predecessor, Eagle (127 qubits). In addition to developments in the payload, Osprey is the first IBM quantum system to involve significant changes to cryogenic infrastructure, primarily the introduction of flex cable wiring. I will discuss the important factors in designing a wiring scheme, the specific advantages of flex wiring versus traditional coax, and the additional advancements to wiring and cryogenics needed to scale for future systems outlined in IBM's quantum development roadmap <https://www.ibm.com/quantum/roadmap>.

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