Quantum Computing – Real-Time Data Processing from a Dilution Refrigerator
Fazal Quadri, Fermilab & SQMS Intern, Supervisor: Nicholas Bornman

Overview of Project
➢ Stream data from the Bluefors Control unit to access physical quantities, such as temperature and helium flow, of the system at different points in the fridge
➢ Display these values, which are continuously updated, on a monitor with an aesthetic webpage
➢ Incorporate numerous connections of the dilution refrigerators into the WebSocket server

WebSocket Script
• Creates a WebSocket server to establish real-time communication between the Bluefors Control Unit and the client computer
• Server receives live data from the Bluefors Unit, such as temperature and pressure readings, and parses it
• Asynchronous handling allows the server to manage multiple connections and serve multiple refrigerators simultaneously.

Sample output of data exported from the Bluefors Control Unit

Dilution Fridge #1
WebSocket Data
Date Value: 12/31/1969, 6:00:00 PM
Temperature: °
Flow: L/min

HTML/JavaScript
• WebSocket connection listens for incoming data from the server, capturing measurements sent by the Bluefors Control Unit.
• Using JavaScript, the webpage dynamically updates the displayed data as new measurements arrive, ensuring real-time visualization for the user.

Acknowledgement & Reference
This manuscript has been authored by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the U.S. Department of Energy, Office of Science, Office of High Energy Physics. This work was supported in part by the U.S. Department of Energy, Office of Science, Office of Workforce Development for Teachers and Scientists (WDTS) under the Community College Internships Program (CCI)