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RHIC polarized proton operation in Run24

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The Relativistic Heavy Ion Collider (RHIC) Run 24 was 27 cryo weeks, operating with collisions at the STAR and sPHENIX detectors. The primary mode was polarized protons at 100 GeV, where there was 22 weeks of physics production. sPHENIX continued commissioning, becoming fully operational after 13 weeks and the addition of isobutane to their TPC gas mixture. STAR had a low luminosity run followed by twenty weeks of high luminosity and radially polarized beams. To reduce the beam-beam parameter and maximize the number of collisions within a small vertex region at sPHENIX, sPHENIX planned to operate with a crossing angle. For 8 weeks, collisions were only at sPHENIX until the beam-beam parameter was sufficiently low to support the additional collisions at STAR. A significant number of power dips earlier in the run greatly affected machine performance and reliability. At the maximum achieved performance, the luminosity was limited by four factors simultaneously: accelerating RF cavity intensity limit, intensity from the injectors, losses at rebucketing, and dynamic aperture. Despite these difficulties, sPHENIX and STAR were able to collect sufficient data commensurate with their goals.

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