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eRHIC high-current, high-charge polarized electron source R&D in BNL

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In order to construct a future electron ion collider with high luminosity, a high average current and high bunch charge polarized electron source is under R&D at Brookhaven National Laboratory. A prototype of a high average current polarized electron funneling gun as an eRHIC injector has been built and in testing in Stonybrook University. Recently, polarized electron gun has been identified as one of the risk factors in BNL eRHIC design. The current, low-risk, eRHIC plan is based on the state of the art performance for the polarized electron gun. It uses a number of individual guns to produce individual electron beams, which are then combined with an RF deflector “tree” to meet the high average current requirement. A polarized electron gun capable of delivering mA average current and 5 nC simultaneously has not yet been demonstrated. In this talk, we will present the latest results of beam combining test using our funneling gun. Also, we will present the research plan and strategy to demonstrate high current high charge polarized electron beam from the source.

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