Expected Luminosity at PANDA

Job of RESR ?

Accumulation and cooling of antiprotons up to 10^{11} antiprotons

Maximum accumulation in HESR directly without RESR 10^{10} antiprotons (injection efficiency drops dramatically beyond 10^{10} antiprotons, because cooling takes much longer for more antiprotons in HESR)

Job of CR ?

Maximum accumulation of 10^8 antiprotons, cooling and acceleration to 3.8 GeV/c

HESR

Collecting of 10^{10} antiprotons takes 1000s (17 min)

HESR accumulates pre-cooled antiprotons at 3.8 GeV/c beam momentum and cools them with stochastic cooling during accumulation to $\Delta p/p = 10^{-4}$ (corresponds to momentum resolution of High Luminosity Mode)

Acceleration and Deceleration maybe 10% loss of antiprotons, Goal to have at least 10^{10} antiprotons in the ring in momentum range 1.5 – 15 GeV/c (increase the accumulation accordingly)

Time-integrated Luminosity without RESR 10^{31} / (cm^2 s) and Peak Luminosity 2 x 10^{31} / (cm^2 s)

For low beam momenta life time of the beam shorter: 10-20% less time-integrated luminosity.

High Resolution Mode:

Additional electron cooling (only momentum range 1.5 – 8.9 GeV/c) $\Delta p/p = 4$ x 10^{-5}

No loss of antiprotons expected

Magnetic field of the Solenoid, cannot be changed rapidly, fix for one filling:

1T below injection momentum

2T above injection momentum

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