Super Bigbite Spectrometer: from the concept to the real device

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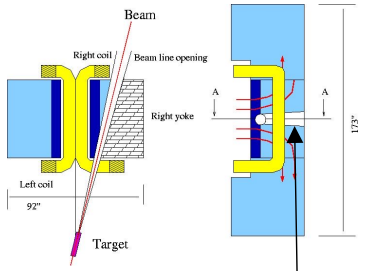
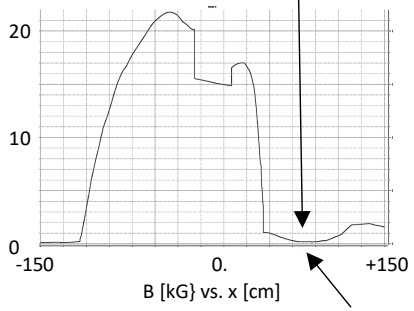
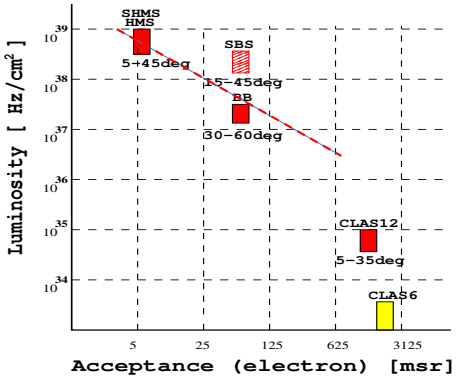
Lubomir came to me with a question: How to do higher Q^2? The GEp advance to higher Q^2 was limited by the solid angle of the proton arm. We need a large solid angle spectrometer at a small scattering angle. The solution was found in February 2007 – the cut in the yoke - SBS.



Leading proposal E12-07-106 was approved in 2007.
Projected cost (2011) $4M required extra DOE funds.
Project was divided into three WBS and approved.

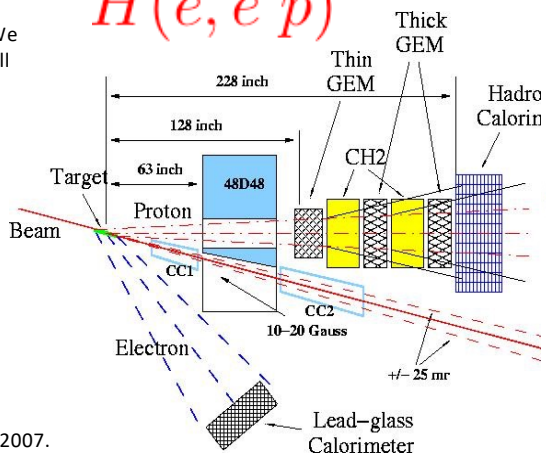


Field is low in the cut for the beam line



Productivity for a high Q^2 exclusive (e, e'N(M)) experiment with the SBS setup is the highest

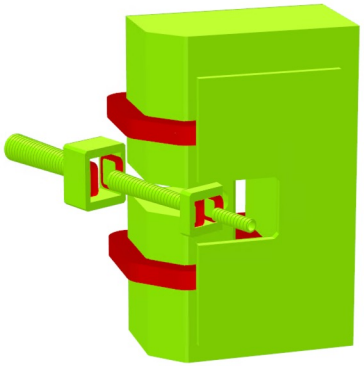
$H(\vec{e}, e'\vec{p})$

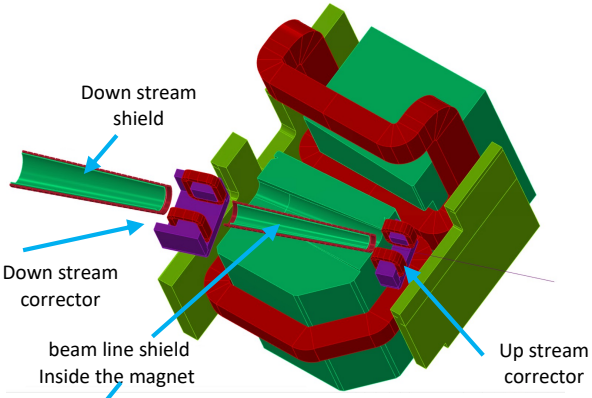


SBS Physics Program

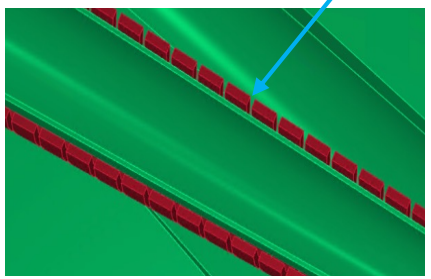
GMn – D(e,e'n/p)
GEn - ^{3}He(e,e'n)
GEp - p(e,e'p) (p -> p polarimeter)
GEn-RP (n -> p & n -> n)
SIDIS - n(e,e'π/K)X
TDIS - p(e,e'p_s)X
Wide Angle Pion Production, KLL
L/T cross section for neutron, nTPE
Strange FF at 2.5 GeV^2 - p(e,e'p)
Double Polarized WACS – p(γ,γ'p)
Axial Vector FF - p(e,n)ν, under development

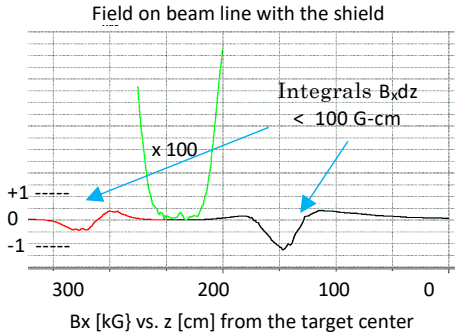
Cut away view of the spectrometer magnet





Two-layer ring-pipe beam line shielding works well for a transverse field (Bx) in a strong longitudinal field (Bz)





Projections for the Nucleon Electromagnetic Form Factors experiments