

Bremsstrahlung Generator for the EIC

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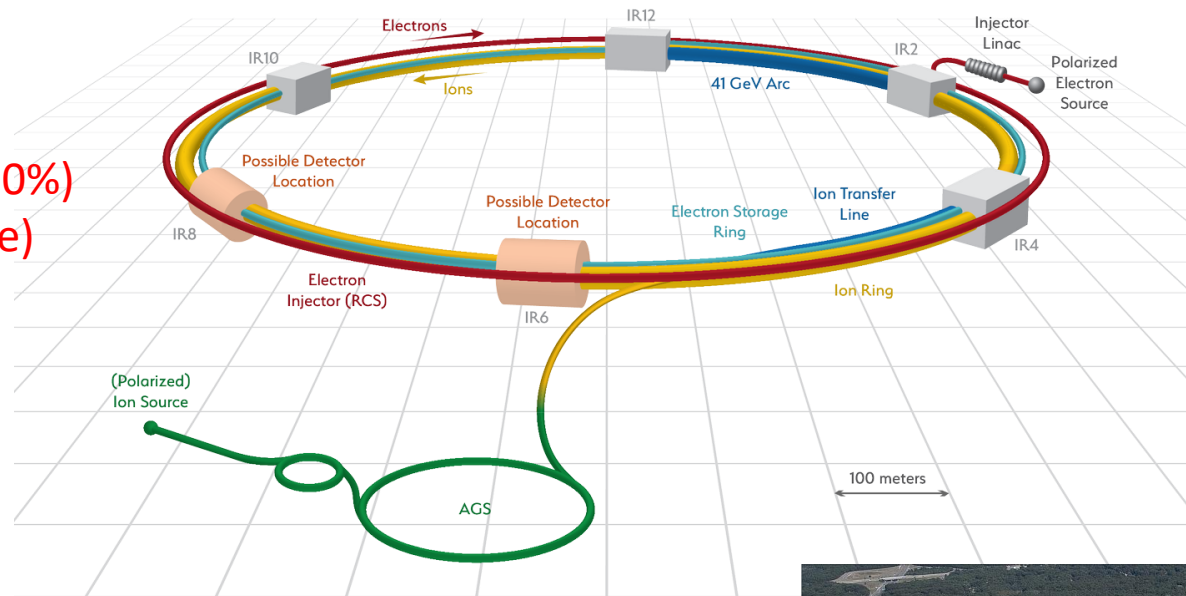
PPSS 2021

Electron Ion Collider

A microscope to investigate QCD at various scales, energies and colour field strengths

For e-N collisions at the EIC:

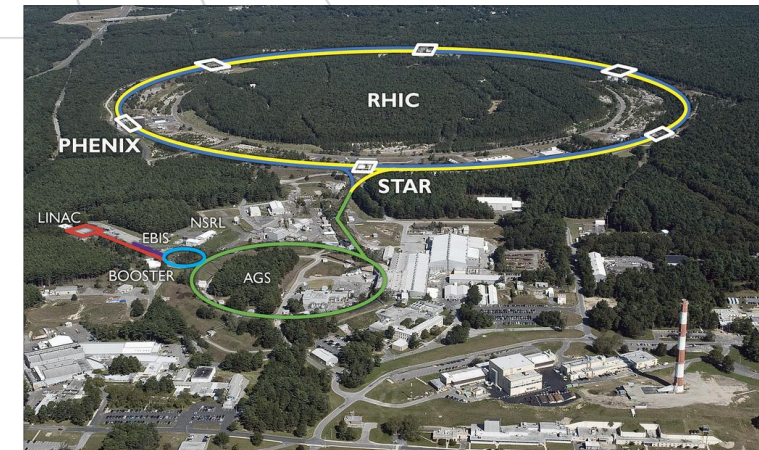
- **Polarised beams:** e (~80%), p, d/³He (~70%)
flexible polarisation patterns (all possible)
use of snakes and spin rotators
- e beam 5-10(20) GeV
- **Variable vs:** 20-100 (140) GeV
- **Luminosity $L_{ep} \sim 10^{33-34} \text{ cm}^{-2}\text{sec}^{-1}$**
100-1000 times HERA!



1212.1701.v3
A. Accardi et al.
Eur. Phys. J. A, 52
9(2016)

For e-A collisions at the EIC:

- **Wide range of nuclei (d→Pb)**
- **Polarised light ions (d and ³He)**
- Variable centre of mass energy
- Luminosity/nucleon same as for e-p



World's **first polarised electron-proton/light ion** (work on heavy ion polarised beams has been started)

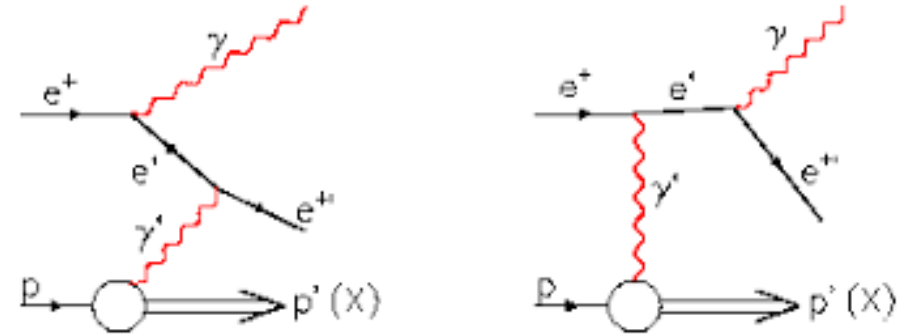
and

electron-nucleus collider

Instantaneous Luminosity L: $\frac{dN_{events}}{dt} = L \cdot \sigma$

Precision: large, well known cross-section σ

At ep(A) colliders one uses bremsstrahlung, $\frac{\delta\sigma}{\sigma} \ll 1\%$
 Simple signature of a forward photon and electron



Aims of the project:

- creation of the C++ version of the bremsstrahlung generator (web interface?)
- simulation of the experimental set-up; a simple (parametrisations) MC

