Protons and neutrons are the building blocks of all nuclear matter. They are held inside the atomic nucleus by the strong force, the same force that generates the dynamic landscape of quarks and gluons that form the substructure of the nucleon. Decades of scattering experiments have produced an intriguing picture of the nucleon. While the nucleon charge and color are a direct sum of the three valence quark properties, the same quarks contribute only 25% of the total nucleon spin and less than 1% of the mass. It appears that the many of the fundamental properties of the nucleon must emerge from the gluons, the carriers of the strong force that confine the quarks inside of the nucleon. Experimental data have shown that the gluon distributions grow dramatical as the nucleon is probed at increasingly smaller distances, raising the question of how and at what scale will these distributions saturate? How do these gluons generate the mass of the nucleon and how much do they contribute to the total spin? And how do the quark and gluon distributions change when nucleons are embedded inside nuclei?

The Electron-Ion Collider (EIC) is a pioneering new particle accelerator that will be built on the current site of the Relativistic Heavy Ion Collider at Brookhaven National Laboratory. It will provide high energy collisions of polarized electrons with heavy ions and polarized protons and light ions. The high luminosity and wide range of center-of-mass scattering energies will facilitate experiments that probe the nature of strong interactions to unprecedented precision. The EIC facility will be equipped with ePIC, a large acceptance, multi-purpose detector designed to perform experiments directly aimed at answering question about gluon properties and dynamics within the nucleon. Integral to these measurements are the backward and central electromagnetic calorimeters (EMCal) , that are required to detect and precisely measure the energy of the scattered electron. The following paragraphs will describe in more detail the experimental techniques used to perform these experiments and the essential role played by the EMCals.

Paragraph on unpolarized structure functions.

* Define inclusive scattering
* Describe very generally a structure function
* Relate spin independent SF to gluon distribution and signatures of saturation.
* Introduce the concept of saturation and how variety of ions and wide Q2 is essential.

Paragraph on polarized structure functions

* Same inclusive scattering as above but now add in spin dependence
* Relate spin dependent SF to gluon helicity distribution
* Provide a little bit of background on current contributions from gluons in the valence region.
* Point to spin dependent EMC effect

Paragraphs on DVCS – see contribution by Richard