Coherent Nuclear Interactions

The nuclei act as sources of fields. The interaction is between the exchange particles of the fields.

Electromagnetic Fields – photons
Strong-Force Fields – gluons(mesons/Pomerons)

$$A+A \rightarrow A+A+X$$

For coherent interactions, the maximum momentum transfer is determined by the nuclear form factor / nuclear size:

$$\max(Q) \cong 1/R$$

This has two important consequences:

1) The final state will have a low p_T, $p_T \leq 1/R$
2) The maximum photon energy is $\cong \gamma(1/R)$

Heavy-Ions are advantageous because $L_{\gamma\gamma} \propto Z^4$

$Z^4 = 4 \cdot 10^7$ for Au